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COOPERS ROCK STATE FOREST
FOREST RESOURCES MANAGEMENT PLAN

by the
West Virginia Division of Forestry

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I. GENERAL DESCRIPTION OF THE FOREST

INTRODUCTION

West Virginia's State Forests were established as areas to demonstrate proper forest management, provide wildlife habitat and enhance recreational opportunities. A managed forest can provide many benefits not realized in an unmanaged forest. Management practices enable foresters to maintain tree vigor at optimum levels. Vigorously growing trees can better withstand stresses such as insect and disease attacks and are better producers of oxygen and consumers of carbon dioxide. Plus they provide better quality habitat for wildlife.

Managed forests contain road systems which enable better protection from fire and afford better chances of detecting insect and disease problems. These roads provide a linear habitat important to some species of wildlife. Road systems can enhance recreational potential for an area such as hiking and biking and can provide access for hunters and nature enthusiasts. A managed forest provides habitat necessary to sustain desirable plant and wildlife species.

West Virginia's State Forests were first inventoried in the 1950's, again in the late 1960's and management plans were prepared in 1971. The first ten-year plan primarily focused on timber management aimed at improving the overall potential to achieve multiple uses of the forest resource. As these forests develop and other broad management objectives can be achieved, more emphasis will placed on other aspects of the forest and the coordinated use and development of these resources. Consideration is now being given to both the economic and social benefits of the various forest resources with emphasis on sustaining and increasing the diversity of the forest. This forest resource management plan will be in effect from years 2005 to 2015, with periodic updates incorporating changes as necessary during this period.

As explained on page 3, the original Coopers Rock State Forest has been delineated into two sections. The majority of the land north of Interstate 68 is leased to West Virginia University and is known as the WVU Research Forest. A few areas on the north and all of the forest to the south of the interstate are managed by the West Virginia Division of Forestry.

A. History of the Forest

1. Area History and Acquisition: The area in and around Coopers Rock State Forest is rich in history and has played an important part in the development of this section of the county and State. As early as 1911, the idea to examine land suitable for state forests was documented. In 1927 a State Forest and Park Commission was created. It consisted of the Governor, Commissioner of Agriculture, Director of Agricultural Extension, State Geologist and Executive Director of the Conservation Commission. Their duty was to determine the availability of land suitable for state forests and parks.

The early history of Coopers Rock revolves around the iron ore industry. The discovery of low-grade iron ore plus limestone in the Chestnut Ridge area, combined with the abundance of hardwoods for charcoal, made this locality ideal for iron manufacturing. Beginning around 1798 many iron furnaces were constructed in the area, including the Henry Clay Iron Furnace in 1834. Most of the furnaces were located near outcroppings of limestone and vast amounts of timber were cut near the furnaces. The heaviest cuttings were in the immediate vicinity of the furnaces but spread outward as time progressed. Many old roads exist on the Forest as a result of the iron ore industry and the lumber industry that followed. The Cheat Mountain iron industry gradually declined after 1848 and suspended operations in 1868. This decline was precipitated by the discovery of rich iron ore deposits in the Great Lakes region and the continued problem of poor local transportation.

In 1900 more timber was selectively cut for telephone poles, cross ties and shingles. Only American chestnut, white oak and red oak were cut at this time. The remaining timber was cut during a period from 1912 until the early thirties, with peak years from 1924-25. Everything, except scattered cull trees, was taken because of the various timber markets.

In 1936 the West Virginia Conservation Commission purchased approximately 12,863 acres from the Lake Lynn Lumber and Supply Company to manage as Coopers Rock State Forest. Two additional later purchases increased the Forest by 180 acres, but in 1970 a right-of-way was granted to the WV Department of Highways for the construction of Corridor “E”, now known as Interstate 68, thus reducing the Forest by 296 acres.

During the Depression era the Civilian Conservation Corps (CCC) was brought in to develop the land for public use and to suppress forest fires. The local camp, named Camp Rhododendron, was constructed near the Fairchance Road (State Route 857) on Kelly Run. These young men, ages 18 to 25, were under the guidance of the US Forest Service and were put to work building roads, structures, ditches and bridges, planting trees and other performing other arduous labor. Their most astounding work was the connection of the Overlook to the ridge top. This was done by constructing a bridge and

carving out the stone steps that are still present today. Much of their other construction work is still present, such as the superintendent's residence, picnic shelters, and the WVU Forest Manager's residence.

In 1959, approximately 7,068 acres were leased for 99 years to the Board of Governors of West Virginia University, for use as a research and teaching forest. Since that time, additional property has been added, resulting in a current acreage of 7,655. This area lies north of Interstate 68, and is now known as West Virginia University Research Forest, or "University Research Forest". For the purposes of this document, only those areas which the WV Division of Forestry is charged with timber management responsibilities will be referred to as Coopers Rock State Forest (Forest). This area includes all of the forest south of Interstate 68, the 422-acre tract on Kelly Run (CCC Annex), Messenger Lake, the Sand Springs Fire Tower site, the archery range on Sand Springs Road and the superintendent's residence and maintenance area. All other areas north of the interstate are under leased control of West Virginia University and information concerning the management of these areas can be reviewed in the WVU Division of Forestry document titled *Forest Management Policies, Guidelines and Objectives for the West Virginia University Forest* (1985).

2. Original Forest Type: Prior to the establishment of a timber industry in this portion of the state, the original forest was primarily oaks and chestnut on the ridges, with hemlock, beech, black walnut and associated species on the lower elevations. Most of the original forest was harvested by the early part of the twentieth century. In addition to the clearing done by the iron ore industry, many areas were cleared for farming. The current forest is primarily of sprout origin, except for areas of hemlock and pine, which are from seed origin.

3. Periodic Descriptions of the Forest: The first planned harvests on Coopers Rock State Forest have been conditioning cuts to improve the stands. Individual trees that were over mature, declining, or of poor form or condition were removed. The remaining trees had more room to develop with less competition, allowing them to grow faster, while at the same time providing benefits for wildlife. These harvests resulted in healthy and vigorous stands. Currently, portions of the Forest which have not been actively managed since State ownership would benefit from silvicultural practices. There are sections of the forest that will always be poorly stocked due to soil limitations. Other sections may be harvested to create temporary openings in the forest to benefit certain wildlife species.

From 1978-80, a grapevine herbicide study was conducted by the USDA-Forest Service, Timber and Watershed Laboratory, on the Kelly Run area of Coopers Rock State Forest. Various methods of chemical treatment were applied to control grapevines in the area. This study resulted in specific recommendations for controlling grapevines using herbicides, in conjunction with other silvicultural treatments. These recommendations are applicable for other public and private forest land in the region.

From 1978 to 1991, four timber harvests were completed on the Forest. These harvests took place on an average of approximately 200 acre sections with an approximate average of 500,000 board feet of harvested volume. Of the total timber volume harvested, approximately thirty-five percent was comprised of yellow poplar, basswood and cucumber magnolia and approximately thirty-three percent was red and white oaks.

In 1989, a Crop Tree Release Demonstration Area of approximately 8 acres was established on Coopers Rock, adjacent to the Henry Clay Iron Furnace Road. This is a joint USDA-Forest Service and WV Division of Forestry study to determine how the selection and release of individual trees affects production of benefits consistent with landowner objectives. This concept recognizes three crop tree categories: timber, wildlife and aesthetics; all of which can be managed individually, or in any combination within a given forest.

The most recent harvest on the Forest was a cooperative project with the Division of Natural Resources, Wildlife Resources Section. This project was a prescribed expansion of an existing wildlife opening. It consisted of harvesting approximately one acre of trees to provide additional early-successional habitat and shrubby cover for wildlife.

B. Recreational Use of the Forest

As with most of the other State Forests, Coopers Rock includes a designated recreation area within the Forest. This area is managed by the WV Division of Natural Resources, Parks and Recreation Section. The improved recreation areas on the Forest contain a 25-site camping area, 154 picnic sites, scenic overlook, the Henry Clay Iron Furnace, three large picnic shelters and one smaller shelter near Rock City. The large shelters are available for daily rental, on a first-come-first-served basis. These areas are served by a concession stand and restrooms near the overlook. The camping area includes a camp store, shower facilities and restrooms. Other improved recreational facilities include Messenger Lake, commonly referred to as the “Trout Pond”. This is an approximately six acre lake located on the northern side of Interstate 68, below the superintendent’s residence and maintenance area. This popular fishing lake contains a population of panfish and bass and is stocked with trout once in February, biweekly during March through May and once in October by the West Virginia Division of Natural Resources, Wildlife Resources Section.

All improved recreational facilities, with the exception of Messenger Lake, are closed to the public from mid-December until April 1st of the following year. Although not sanctioned, some winter recreational activities such as ice fishing and skating do occur on Messenger Lake.

Other recreational opportunities at Coopers Rock State Forest include, but are not limited to, hiking, picnicking, sightseeing, hunting, trapping, nature observation, photography, rock climbing, mountain biking, bird watching, cross-country skiing and geocaching. Most of these activities are seasonal, while others are enjoyed throughout the year. Wheelchair accessible facilities include a paved path and wooden platform at the overlook, the restrooms near the picnic shelters and a small fishing pier at the Trout Pond.

During the period from July 1994 through June 2004 Coopers Rock was the most visited State Forest in the first three and last two years. The other five years (July 1997- June 2002) Coopers Rock was the second most visited State Forest. *Reference: Attendance records provided by the Division of Natural Resources, Parks & Recreation Section.*

Coopers Rock State Forest is one of the most visited forests in the state. Due to the high number of recreation visits, a recreational use plan would be beneficial. This type of document would need to be initiated by an agency with expertise in that field. Until such a document is prepared, the Division of Forestry will continue to be sensitive to multiple uses when implementing silvicultural practices.

C. Management Responsibilities

At present, the West Virginia Division of Forestry, the West Virginia University Division of Forestry, the West Virginia Division of Natural Resources, Parks and Recreation Section and the West Virginia Division of Natural Resources, Wildlife Resources Section all have management responsibilities on Coopers Rock State Forest.

The West Virginia Division of Natural Resources, Land and Real Estate Section, holds title to the property and has the responsibility for leases, agreements and ownership authority involving the Forest.

The majority of the Forest on the north side of Interstate 68 is managed by the West Virginia University Division of Forestry under a lease agreement. The “WVU Research Forest” is used as a teaching facility for students in forestry and wildlife related programs. Research and special use areas are used to show the students the various procedures and techniques employed in forestry activities. A review of research work and plans is conducted each year with the West Virginia Division of Forestry, the lead agency for forest resource management on Coopers Rock State Forest.

The Division of Natural Resources, Parks and Recreation Section, has management responsibility for the improved recreation areas and facilities on the Forest. Included are the camping area, picnic areas and shelters, trails, overlook area, concession stand, Henry Clay Iron Furnace, archery range and the residence/service

area. They also have law enforcement jurisdiction over the entire Forest. In addition, this agency maintains hiking trails and cross-country ski trails throughout the Forest through a verbal agreement with the Division of Forestry.

The Division of Natural Resources, Wildlife Resources Section, has the responsibility to manage and maintain wildlife on the Forest. This includes managing fisheries in area streams, rivers and lakes, maintaining food plots, manipulating open areas, conducting research and data collection, providing limited law enforcement and advising the Division of Forestry in regard to wildlife needs.

The Division of Highways is responsible for maintenance of all Forest roads which are included on their county road inventory. These include the Main Forest Road (County Road 73/16), the Henry Clay Iron Furnace Road (Park & Forest Route 801), the McCollum Camping Area access Road (Park & Forest Route 802) and the Picnic Loop Area access Road (Park & Forest Route 803), all of which are contained in the main body of the Forest. Two short sections of County Road 73/2 (Pisgah Road) are contained within the main body of the Forest on the eastern edge. County Road 69/5 (Quarry Run Road) and Delta Road 26 pass through the CCC Annex section of the Forest.

The Division of Forestry has within its jurisdiction and supervision the **state forests**, other forests and woodland areas, the protection of forest areas from injury and damage by fire, disease, insects and other pestilences and forces, the management of forest areas for natural resources, conservation and undeveloped recreational activities, ...(§19-1A-3).

The Division of Forestry is mandated by law to manage the state forests for "silviculture and scientific research, developed and undeveloped outdoor recreation; propagation of forest trees, fish and wildlife; wildlife and fisheries management; aesthetic preservation; hunting and fishing; timber production; and demonstration of state-of-the-art forestry (sic) management, and therefore should be managed on a multiple-use basis" (§19-1A-1).

Multiple use management is accomplished through interagency cooperation to implement a natural resources stewardship ethic. This cooperation is needed to accomplish the mandated goals and to serve the many needs of the public. Additional duties of the Division of Forestry include maintenance of forest roads, cooperation in recreational opportunity development beyond the improved recreation areas and maintaining the painted Forest boundary.

D. Physical Features

1. Location, Area and Boundaries: Coopers Rock State Forest is located 13 miles east of Morgantown and 8 miles west of Bruceton Mills, with primary access to the Forest gained from Interstate 68, Exit 15. This interstate highway (formerly US Route 48) basically bisects the Forest as it runs in an east-west direction from Morgantown, WV to join Interstate 70 at Hancock, MD. The Forest also straddles a county line, with acreage in both Union District of Monongalia County and Grant District of Preston County.

The nearest towns having Post Offices are Bruceton Mills to the east and Cheat Lake to the west. The southern boundary of the Forest borders the Cheat River while the northern boundary crosses Chestnut Ridge. The entire Forest area, almost 13,000 acres, encompasses just under 20 square miles.

2. Topography, Geology and Climate: The topography of the Coopers Rock area has been determined by stream erosion rather than glacial or igneous activity. The Forest is located on the Allegheny Plateau, an area in which the rocks are essentially horizontal with only broad folds of sedimentary layers. Coopers Rock State Forest is covered by the Lake Lynn, Bruceton Mills and Masontown 7½-minute topographic quadrangle maps, published by the U.S. Geological Survey.

The streams on this plateau have set up a drainage pattern with little apparent regard for structural conditions or for the characteristics of underlying rocks. The area of Coopers Rock State Forest, under Division of Forestry management, drains into the Cheat River, mainly through Clay Run, Quarry Run and Scott Run. Lesser drainage areas on the Forest are Kelly Run, Coles Run and Lick Run. In general, the area has fairly level plateaus with deep hollows. The lowest point on the Forest is 870 feet elevation at river level, while the highest point at 2,600 feet is at the old Sand Springs Fire Tower site. This is an overall difference of 1,730 feet, the large total relief provides for the vistas seen from the Coopers Rock Overlook.

The geological features in and around the Forest were formed during the Paleozoic era. Coopers Rock lies on the Chestnut Ridge anticline, which extends southwest from Pennsylvania across most of West Virginia. The surface rocks are sedimentary and were formed of material laid down during the Mississippian and the Pennsylvanian periods. The rock layers which are exposed at and below the overlook in the Forest are predominately sandstones, shales and limestones. The uppermost layer is known to geologists as the Upper Connoquenessing Sandstone of the Pottsville Series which, being very resistant to agencies of erosion, forms a protective cap at the top of the gorge. Other geological series present on the Forest include the Mauch Chunk, Greenbrier and Pocono.

The climate on the Forest is characterized by long winters and short summers. Climatic data from the Coopers Rock Weather Station, located near the University Forest Headquarters, differs markedly from that at the Morgantown Airport (approximately 8 miles to the southwest) or the Brandonville Station (4 miles to the east). According to records for the ten-year period 1973-1982, the Coopers Rock area experienced an average annual precipitation of about 56 inches, average total annual snowfall of 90 inches, with average temperatures ranging from 38 to 58 degrees.[1]

3. Minerals: The major minerals present on the Forest include iron ore, coal, oil and natural gas. The majority of the Forest is owned in fee by the State of West Virginia. All mineral rights are owned, with the exception of 141 acres of coal and 110 acres of oil and gas.

Coal seams exiting under the Forest include the Upper Freeport and Upper Kittanning veins, both lying beneath parts of the CCC Annex area *(this information was obtained from the WV Geologic and Economic Survey Coal Bed Mapping Project)*. No prospecting or test drilling has been done on the Forest itself, but coal has been mined in the immediate surrounding area. No oil or gas wells have been drilled on the Forest; however, wells drilled on other properties in the immediate area have been productive. Prospects of drilling producing wells on the forest property are good, as the sandstones which usually contain rich deposits of oil and gas are present under the Forest. This has prompted offers from oil and gas companies in the past, but as yet, no agreements have been made for mineral extraction.

When mineral exploration does occur, the Division of Forestry works with the other agencies involved insuring that the principles of multiple-use are followed. The Division of Natural Resources, Land and Real Estate Section holds title to all the surface property and the portion of minerals held in fee. All arrangements with license agreements and leases are handled through that office. Access roads and other surface disturbances are overseen by the Division of Forestry. Road layout and location approval are controlled by Forestry personnel. The timber to be removed for necessary exploration and extraction work is designated and appraised by the Division of Forestry and the company involved is invoiced for the timber value. Reclamation, including choices of seed mixtures is decided in cooperation with the Wildlife Resources Section of the Division of Natural Resources.

E. Protection (Historical - Current Threats)

Coopers Rock State Forest is heavily used and needs protected from fire, insects, disease, unwise development, encroachment and damage from overuse. All agencies that have administrative responsibility on this area must be aware of the dangers and take appropriate steps to deal with the situations as they arise.

From an historical standpoint, the threat of uncontrolled fire on the Forest was much more prevalent in the past than today. Prior to 1936, this area was routinely cut-over and due to the abundance of iron furnaces, many charcoal fires burned continuously. Occasionally, one of these fires would escape and destroy valuable forest resources. Fires would also be started by the railroad engines throwing sparks along the tracks and into slash piles. After the land was purchased for use as a State Forest and the CCC arrived, fire prevention and control programs were established.

Fire is still a prime concern at Coopers Rock because of the heavy use of the area. Fires are more likely to occur when a large number of people are using the forest. Campfires, picnic fires and incidental fires from cigarettes, matches and fireworks are most common. Arson fires do occur, but are not major causes. The potential exists for fires getting started and escaping in the Cheat River Canyon. The steep slopes and abundance of fuels could result in a major fire in this area. The Division of Forestry is in the process of developing a general fire plan for Coopers Rock State Forest. This plan should include an agreement with the Parks and Recreation Section of DNR and should contain both prevention and suppression techniques. Fire suppression assistance is available from the Division of Forestry, Parks and Recreation personnel, the WVU Research Forest Manager, two adjacent volunteer fire departments, Cheat Lake VFD and Bruceton/Brandonville VFD and the Monongalia Registered Forest Fire Crew. All visitors must be made aware of forest fires and the use of fire must be restricted to designated areas and closely monitored. Above all, extreme caution must be exercised during critical fire danger periods and the use of fire must be prohibited in inaccessible areas, especially in the Cheat River Canyon.

A constant threat to the prosperity of any forest land arises from insect and disease activities. On rare occasions, an onslaught from these invaders can significantly alter the character of a forest. Such a change occurred when the chestnut blight invaded West Virginia in the early 1900's. Coopers Rock State Forest had significant numbers of chestnut trees, but they were lost from the Forest as they were in other regions. Efforts were made to stop the spread of the blight and a State Chestnut Blight Commission was developed. Although the Commission disbanded years ago, scientists from West Virginia University and elsewhere continue to research and combat this problem. Today, many chestnut sprouts remain and often grow to as large as 6 or 8 inches in diameter; however, the blight is still present and usually kills the trees before they get larger.

A major pest to invade West Virginia in the more recent past has been the gypsy moth. This insect has slowly been working its way from Massachusetts since 1889 and had established itself throughout the Northeast by 1987. The gypsy moth caterpillar is among the most destructive insects in oak forests and has the potential to inflict major damage on Coopers Rock State Forest. However, through cooperative agreements and programs between the WV Division of Forestry, WV Department of Agriculture, and the USDA-Forest Service, an aggressive monitoring and spraying program was developed for State Lands. Sample plots were set up on the Forest and monitored annually until gypsy moth egg mass populations reached a treatment threshold.

The first spray treatment on Coopers Rock State Forest was in 1990. Subsequent spray applications were conducted in various areas in 1991, 1992 and 1994. Acreage treated each year was based on data collected by WV Department of Agriculture personnel. Through these treatments, gypsy moth defoliation on the Forest has been kept to a minimum over the years, with only approximately 63 acres being defoliated between the years of 1990-1994.[2]

In summary, control measures put in place on the Forest during the period of heavy infestation worked fairly well. The leading edge of the infestation is now south and west of Coopers Rock, but the Forest is still considered to be "generally" infested, but with low populations present. In the spring of 1996, the pathogen fungus *Entomophaga maimaiga* was responsible for reducing the gypsy moth populations in the Forest. Current management recommendations include continued monitoring of populations so that control measures can be initiated if needed in the future.

Many pests influence the development of the forest, but rarely do they have the impact of a chestnut blight or gypsy moth invasion. Among these is a group of mixed species known as the looper complex, more commonly known as inch worms. This complex is a group of three insects with similar habits which do similar damage and are often found together. Although no significant damage attributable to these pests has been reported recently on the Forest, the threat is always present.

Another forest pest which will most likely have an impact on the Forest is the hemlock woolly adelgid *(Adelges tsugae)*. These soft-bodied, fluid-feeding insects, closely related to aphids, are a serious pest of Eastern hemlock trees. Hemlock woolly adelgids display several different forms during their life cycle, including winged and wingless adults. The females are oval, blackish-gray and about 1mm in length. Newly hatched nymphs (crawlers) are approximately the same size, reddish-brown and produce white, waxy tufts that cover their bodies throughout their life. The white-cottony masses are 3mm or more in diameter. The presence of these cottony flecks on twigs and at the base of hemlock needles is the most obvious indicator of an infestation. The egg sacs of the hemlock woolly adelgid look like the tips of cotton swabs clinging to the undersides of hemlock branches and are also an indicator of an infestation. Hemlock woolly adelgid populations are usually located near the bark at the base of the needles. Hemlock trees are injured by the adelgids inserting their piercing-sucking mouthparts into the base of the needles and feeding on the tree's fluids. Moderate populations of hemlock woolly adelgids may cause a reduction in tree health, while severe infestations may result in premature needle drop, reduced twig growth, dieback or even tree death. Control of the pest includes applications of dormant oils in March to kill eggs, applications of pesticides specifically labeled for hemlock woolly adelgid in April to control crawlers and systemic insecticide applications the rest of the year to control pests on individual trees. These methods are generally reserved for individual yard or specimen trees. In forested areas, release of predatory beetles is being tried as a biological control on an experimental basis. Hemlock trees in Coopers Rock State Forest and State-wide are important for providing shade to small streams which helps to

maintain lower water temperatures. The loss of these trees, especially along high-quality creeks and streams, could have a detrimental effect on water quality and aquatic species habitat and populations.

Currently, there are no known infestations of hemlock woolly adelgid on the Forest, but infestations have been found in parts of Preston County, West Virginia. Hemlock trees on the Forest are being monitored for signs of this insect pest. If and when hemlock woolly adelgids appear on hemlock trees in Coopers Rock State Forest, appropriate control measures will be taken. This is especially important in the virgin hemlock area on the West Virginia University Research Forest portion of Coopers Rock State Forest. The virgin hemlock area is a small remnant population of old-growth hemlocks with a popular hiking trail accessing the area. These trees are of such high aesthetic value that individual tree systemic pesticide applications may be considered.

Overuse of certain areas at Coopers Rock State Forest is a definite long-standing problem. In some areas, particularly the overlook, the trees and understory have been damaged by overuse from too many visitors. In this area where the soil is shallow and rocky, many trees die each year and most of the natural understory no longer exists due to soil compaction and human activity. Plans for development should limit and control use of this area as well as restrict the use of other areas.

Invasive plant species are also an ongoing threat to the Forest. Several invasive plant species are already present on the Forest and others may be present now or in the future. Plans will be made to deal with invasive plant species' populations utilizing appropriate control measures. See Section II, part I for additional information on invasive plant species.

F. Flora and Fauna

1. Cover Types: According to the Society of American Foresters publication titled *Forest Cover Types of the United States and Canada*, forest cover type is "a descriptive classification of forest land based on present occupancy of an area by tree species". Several classification systems have been developed over the years, many with shortcomings that led to more attempts at classifying the forest. The previous management plan for Coopers Rock State Forest (1971) used a system based on the Society of American Foresters (SAF) forest cover types published in 1954.[3] When writing the first management plan, foresters were faced with a unique situation at Coopers Rock. The initial growth and species composition of the Forest had been heavily influenced by early harvesting and uncontrolled fires, thus leading to development of atypical forest stands. These did not specifically conform to accepted forest cover types of the time. Therefore, the foresters had to broaden the classification of cover types on Coopers Rock State Forest, while still keeping in line with the SAF system.

The Society of American Foresters revised and refined the classification and published their new system as *Forest Cover Types of the United States and Canada* in 1980. The classifications in this book are based on basal area of the predominant species or species combination. The term *pure* means stocking of 80 percent or more by a single species, *majority* means comprising more than half the stocking, and *plurality* means comprising the largest proportion of stocking when combined and each species being at least 20 percent when taken alone.

Current inventory data and improved GIS mapping techniques will be used to further refine cover types on the Forest utilizing the Society of American Foresters (SAF) current (1980) forest cover types. Succession will eventually become a factor, and more typical forest cover types will evolve on the Forest. The forest stands found on Coopers Rock fall under two general cover type groups: oak-hickory and yellow poplar. Each of these groups include many specific forest cover types. A brief description of each group and its components follows:

OAK-HICKORY GROUP - Includes SAF 1980 Types (52) White oak-black oak-northern red oak

This type group comprises most of the dry ridge and slope areas of the Forest, covering approximately 53 % of the commercial forest area. There are many combinations of oaks, hickories and other hardwoods in association and these vary from place to place.

In areas that closely resemble type 52, white oak, black oak and northern red oak comprise a majority of the stocking. Other oaks usually present include scarlet oak and chestnut oak. Other tree associates occur, with the most common being yellow poplar, blackgum, sugar and red maples, white and green ash, elms, basswood and cucumber magnolia, with occasional beech, black cherry, black walnut and eastern hemlock appearing. White oak is present over the range of sites from moist to dry. Northern red oak is more prevalent on moist sites, lower and middle slopes on north and east aspects, coves and benches with deep, well-drained loamy soils. Black oak is usually abundant on the drier south and west aspects, upper slopes and ridges.

YELLOW POPLAR GROUP - Includes SAF 1980 Types
(57) Yellow poplar
(58) Yellow poplar-eastern hemlock
(59) Yellow poplar-white oak-northern red oak

The different forest cover types in this group comprise approximately 47 % of the commercial forest land on the Forest. These types are usually found lower on the slopes, along stream bottoms, and in moist cove sites.

Yellow poplar is a predominant species in these cove hardwood types (SAF Forest Cover Types 57,58 and 59), with associate species being cucumber magnolia, black cherry, northern red oak, red maple, ash and black locust. It is associated with many different species, mostly those common to moister sites, but associates will vary based on region. Yellow poplar has been found to be more responsive to site quality differences than other Appalachian hardwoods by outgrowing them in height on the best sites.

As related to type 57, yellow poplar is pure or comprises a majority of the stocking in the type. This type occurs through much of the East, although it is often in small patches. It is most abundant in the central and southern Appalachians at low elevations, but may be found up to 3,500 feet, and may occur in broad interrupted bands of hundreds of acres along north- and east-facing slopes, and in much smaller areas in coves and bottoms. The type is temporary in the successional scale as yellow-poplar is very intolerant of shade and requires openings to develop well. In the central Appalachians where conditions are optimum, yellow poplar is long lived but is gradually replaced by sugar maple, basswood, American beech, red maple, northern red oak and hickories if it is undisturbed.

Type 58, yellow poplar-eastern hemlock, occurs in the Appalachians, in the Cumberland Mountains and locally on the dissected Allegheny Plateau from West Virginia to northern Georgia at elevations between 1,200 to 4,000 feet. Generally its occurrence is limited to deep coves, moist flats and ravines, but occasionally it is found in strips along larger stream bottoms. While yellow poplar and eastern hemlock make up the majority of stocking, associates of this type include white ash, yellow birch, basswood, cucumber magnolia, sugar maple, northern red oak, black oak and white oak.

The other forest cover type under this group on the Forest is type 59, yellow poplar-white oak-northern red oak. In addition to the main species, this forest type usually contains a large number of mesic (moist) site species as associates. At lower elevations, these include black locust, white ash, black walnut, sweet birch, butternut and hemlock. At higher elevations, species like black cherry, buckeye, cucumber magnolia, white ash, American beech, sugar and red maples, and white pine may be present.

This type is characteristic of mountain coves, thus making it one of the types included under the general designation “cove hardwoods”. Nonetheless, it is even more extensive on moist north- and east-facing slopes and on well-drained flats. High site quality, which requires ample soil depth, moisture and loose texture, is a major factor determining occurrence of this forest type. As site index decreases, the type gradually gives way to upland oaks.

Many stands of this type have evolved through natural succession from the yellow poplar type, which is particularly sensitive to site quality variations. Some stands

have been established after heavy cutting, wildfire or blowdowns in yellow poplar or mixed hardwoods. Yellow poplar is less tolerant of shade than the other type species and many of the associates, thus making it probable that this long-term subclimax type will be replaced eventually by an upland oak climax if there is no major stand disturbance. Ground fires in sapling stands of the type may eliminate the less fire resistant yellow poplar, basswood, cucumber magnolia and white ash, resulting in dominance by oak types. Wildfire history often explains the presence of mixed oak forests on typical cove sites where yellow poplar-white oak-northern red oak would normally be expected[4].

2. Timber Size Classes: For the purposes of this management plan, the vegetative cover on the commercial forest land area of the Forest has been classified into broad categories. These categories were also used in the previous management plan.

The first category is *open land*. According to the original plan guidelines, this is any area that is less than 10% stocked with trees. This means that it is usually covered in grass or other vegetation. Other areas that may be grouped under this heading include reclaimed skid trails, truck haul roads and landings from previous harvest operations. These areas are seeded after logging and mowed periodically to maintain their herbaceous cover. Also included in this category may be any areas used as wildlife openings.

Next is the *seedling and sapling* category. These are basically areas that are over 10% stocked, but consist of trees no larger than 5 inches in diameter. These would likely be older clearcut areas, areas that have recovered from storm damages or previously cleared areas that may have reverted to trees. There may be some small areas of this class on the Forest, but they would very likely be less than an acre in size.

For the purpose of this plan, the forest land managed by the WV Division of Forestry on Coopers Rock State Forest falls into one of the three following categories. *Poletimber* is considered as anything larger than 5" diameter at breast height (dbh), but less than 12" dbh. This category is also limited to having an average volume per acre of 1,500 board feet or less. Next is *light sawtimber*, which includes all commercial forest acreage with trees averaging more than 12 inches dbh, but having not more than an average of 5,000 board feet per acre of volume. This is sometimes referred to as small sawtimber. The last category is *heavy sawtimber*, which could also be referred to as large sawtimber. This is any area that contains an average volume of 5,000 board feet or more per acre of volume. The majority of forest land on the Forest is in this category.

3. Wildlife: As with any forested area, Coopers Rock State Forest is home to many wildlife species. This section of the plan will describe both the traditional game and nongame wildlife species found on the Forest.

Traditional Game Species

Wildlife populations on Coopers Rock State Forest are very well established. With proper management techniques, these populations can be maintained at optimal levels. The application of silvicultural practices on the Forest is the primary technique which can be used to enhance wildlife populations on the area.

The wild turkey population is currently below harvest objectives (two spring gobblers per square mile). Additional brood range is needed to optimize the turkey population. The population of ruffed grouse and other forest species which thrive on early successional habitat is low, and could be enhanced by even-age silvicultural practices. Even-age management would promote a higher stem density which would be consistent with and enhance ruffed grouse habitat.

The gray and fox squirrel populations on the Forest are very good. Squirrel hunting provides numerous recreation hours afield and is an important component of the Forest's use. Whitetail deer populations on the area fluctuate with mast conditions. Using a good balance of silvicultural practices which provide both regeneration and mast producing trees would benefit deer on the Forest. Browsing areas are one element of deer habitat which is limited on Coopers Rock to small clearings and field edges. The black bear population is currently expanding on the Forest and in the surrounding area. Coopers Rock has the potential for a good bear community due to its size, terrain and heavy forestation.

The potential for furbearer populations is limited to raccoon and fox due to the lack of streams and riparian habitat on the Forest. The raccoon and fox population is currently good on Coopers Rock State Forest. Cottontail rabbit populations on the Forest are low because the area is heavily forested. Populations that exist are limited to wildlife openings and road edges. Rabbit population levels will always be limited due to the lack of open, shrubby habitat.

Nongame Species

Many bird species visit and use Coopers Rock State Forest during the year. Some, like the chickadee, titmouse and cardinal are permanent residents. Here, they spend their entire lives finding everything they need to survive: food, water, protection (cover), and a safe place to raise their young. Other birds, such as the scarlet tanager, red-eyed vireo and hooded warbler temporarily leave their winter homes in South America and Mexico and fly hundreds of miles to places like the Forest where they stay just long enough to raise and feed their young on the area's abundant food resources. Still other species like the white throated sparrow and slate colored junco travel south to the Forest for the winter.

Some birds, like the cerulean warbler, are specialists requiring specific habitats for survival. While others are generalists like the American robin, which adapt readily to

changes in their environment. Some birds fulfill all their needs in more open areas like old, grown over fields while others prefer the mature forest. Through the use of various silvicultural practices, the Division of Forestry's goal is to maintain and/or increase bird diversity by providing different habitats.

West Virginia is also part of a center of distribution for amphibians, especially salamanders. Large populations of these animals are usually found in mature forests with plenty of rock cover and downed woody material. Twenty-two species of amphibians have been observed or are likely to occur on Coopers Rock State Forest.

Seventeen species of reptiles have been observed or are likely to occur on the Forest. Three out of the four turtles are aquatic, needing clean water and healthy aquatic communities. The snakes and lizards use a variety of habitats and often utilize edge habitat. The two venomous snakes (Northern copperhead and Timber rattlesnake) occur mostly in rocky habitat.

Forty-two species of mammals have been observed or are likely to occur at Coopers Rock State Forest. Most are small mammals residing in a variety of habitats throughout the Forest. Forest species, such as mice *(Peromyscus spp.)*, woodrats *(Neotoma spp.)* and shrews *(Sorex spp.)* are most abundant in areas with high proportions of rocks and woody material on the ground with dense groundcover. Other species such as chipmunks *(Tamias spp.)* and woodchucks *(Marmota spp.)* thrive in more open areas that provide a variety of grasses and sedges. Bats use a variety of habitats, roosting in forested areas and foraging over fields, water and forests.[5]

Listings of wildlife species found or likely to live on Coopers Rock State Forest are included in the Appendix.

4. Rare, Threatened and Endangered Species: Several state and nationally rare plants and animals occur on the Forest. Special attention will be paid to the habitat needs of these species. Green salamanders *(Aneides aeneus)* and Allegheny woodrats *(Neotoma magister)* have both experienced population declines through much of their range. They live in rocky and cliff areas. The salamanders *(Aneides aeneus)* prefer damp rock faces with deep horizontal crevices and are usually only active in the spring at night. Allegheny woodrats *(Neotoma magister)* are active all year. They prefer rocky crevices, talus slopes and cliffs. They construct extensive nests under rocks and in boulder piles and like to pick up shiny objects.

The small-footed bat *(Myotis leibii)* is the smallest bat in West Virginia, usually weighing about 5 grams (approximately the weight of a nickle). Little is known about its ecology. This bat hibernates in caves and mines and usually roosts in rock outcrops or talus. It is possible that this species hibernates in rock outcrops and talus as well. Small-footed bats have also been found roosting in the expansion joints of concrete

bridges. Although little is known of its foraging habitat, two bats radio tagged in Pendleton County were found to forage in oak dominated hardwood forests. Historically, this bat has been observed in the vicinity of the Overlook, and recently it has been found during winter bat surveys at Lower Beaverhole and Cornwell caves, both within the Cheat River Gorge. A small-footed bat was also observed in the fall roosting in a fissure in a rock outcrop near Lower Beaverhole Cave. It is likely that this species roosts in cliff and talus habitats throughout Cheat Gorge.

The Indiana bat *(Myotis Sodalis)* is listed as federally endangered. This bat hibernates in caves and forms maternity colonies in trees, usually under loose bark. Females may migrate long distances between summer and winter habitats. Males often stay close to the hibernation site during the summer. A small population of about 140 Indiana bats hibernates in Cornwell Cave in Cheat Gorge. The area within five miles of the cave is likely to be used by male Indiana bats in the summer. During the fall swarming period, bats of both sexes will use the area before they enter hibernation. No part of Coopers Rock State Forest is within 5 miles of Cornwell Cave.

The flat-spired three-toothed land snail *(Triodopsis platysayoides)* is a federally threatened species found only in Monongalia and Preston counties. This species is restricted to about 13 miles of the Cheat River Gorge and some of the major tributary ravines. It is usually associated with sandstone outcrops, boulder fields and talus. At one site it occurs around the entrance of a limestone cave. Its largest population occurs near the Overlook and it is found at other sites both upstream and downstream of the Overlook.. Management to protect this species centers on reducing foot traffic through the snail's habitat. Fences were constructed in the spring of 1997 to re-route traffic away from the most heavily impacted area near the Overlook. Other factors that may affect the microclimate the snail needs include fire and the defoliation of trees. Protection against gypsy moth defoliation has been and continues to be a priority in these areas. It may be possible to enhance habitat by encouraging tree growth around suitable rock features that are presently in open situations.

The butternut tree *(Juglans cinerea)* is a federal candidate species, category 2. Sweet scented shrub *(Calycanthus floridus var. glaucus*, a.k.a. Carolina allspice and Strawberry bush*)* is a state rare species reaching the northern limit of its range at Coopers Rock.

Rare plant species that may grow on the Forest include: the lance-leafed grape-fern *(Botrychium lanceolatum var. angustisegmentum)*, climbing fern *(Lygodium palmatum)*, smooth rose *(Rosa blanda)*, hedge nettle *(Stachys tenuifolia var. tenuifolia).* Rare wetland or riverine plant species include: white monkshood *(Aconituum reclinatum)*, hoary sedge *(Carex canescens)*, jointed rush *(Juncus articulatus)*, whip nutrush *(Scleria triglomerata)* and branching bur-reed *(Sparganium androcladum (Engelm.) Morong,* a.k.a. staminate bur-reed*)*.

Rare fish that may live in area streams include the redsided dace *(Clinostomus elongatus)* and Cheat minnow *(Rhinichthys bowersi)*. Another possible rare mammal is the meadow jumping mouse *(Zapus hudsonios)*. The strip of Greenbrier limestone which lies midway down the gorge may harbor other rare species. Any sighting of these species will be reported to the WV DNR Natural Heritage Program[6] and steps taken to protect these populations. Unique physical features, such as caves and cliffs, are often inhabited by rare species. These features should not be disturbed.

More information regarding the Natural Heritage Program and the rare species found on Coopers Rock State Forest can be found in the Appendix.

G. Soils Information

The Natural Resources Conservation Service (formerly the Soil Conservation Service) of the USDA is the lead agency in matters relating to the nation's soils. This agency usually has field offices in each county. Soil surveys were often conducted on adjoining counties at different times. The land area of Coopers Rock State Forest spans over portions of two counties, Monongalia and Preston. The soil surveys for these counties were not done at the same time. Therefore, maps and aerial photos may not align perfectly near county borders, and some duplication of information may be seen.

Soils information for Coopers Rock State Forest was supplied by the NRCS for both Monongalia and Preston Counties, with each county represented separately. The following descriptions will also examine the soils present based on county.

1. Monongalia County: Soils found on the Monongalia County side of Coopers Rock State Forest include Buchanan and Ernest, Dekalb Complex, Ernest, Gilpin, Tilsit, Udorthents and Upshur-Belmont.

The Buchanan and Ernest very stony soils are found mainly on the southeastern end of Monongalia County. These soils have a moderately high to high productivity potential for timber. They are also well suited for wildlife requiring habitat conditions of wild herbaceous plants, hardwoods and conifers, as well as for woodland wildlife. They are poorly suited for wildlife that find habitat in open lands or wetlands. Moderate limitations exist in these soil types for developed recreation due to slope, large stones and wetness.

The Dekalb Complex is the most common soil type on the Monongalia County side of the Forest, accounting for approximately 70% of the total land area. This soil is comprised of a channery loam to a very stony loam, the latter being common below the Overlook and in other very steep areas of the Forest. The soil has a high to moderately high productivity potential for timber, but severe limitations exist for developed recreation due to slope and depth to bedrock. This soil type is fairly suited to woodland wildlife and those that require wild herbaceous plant, conifer and hardwood habitat.

According to the soil survey maps, Ernest silt loam is found in only one location on the Forest, that being the area immediately surrounding the reservoir for the Forest's water system. This soil has a high to moderately high potential for timber. This soil is suited to the types of wildlife that require habitat conditions of grasses and legumes, wild herbaceous plants, conifers and hardwoods. This soil is also well suited to the types of wildlife that find habitat in open land and woodlands, but not for wetland wildlife species. There are moderate limitations in this soil for developed recreation due to slope, erodibility and seasonal softness of the soil.

The Gilpin silt loam soils are found along the Preston County border. These soils have a high to moderately high productivity potential for timber and are well suited for wildlife requiring grasses, legumes and wild herbaceous plants, but are only fairly suited to those requiring hardwood and conifer habitat. It is also only fairly suited for species that find habitat in open lands and woodlands. As with the other soils, there are moderate limitations for developed recreation due to slope and erodibility.

The Tilsit silt-loam soils are found in the southeastern and eastern sections of the county. These have a moderately high productivity potential for timber. This soil is suited for wildlife that find habitat in woodlands and open lands and for those that require habitat conditions of grasses, legumes, wild herbaceous plants, hardwoods and conifers. Slope and wetness limit the development of recreation in this soil type.

The Udorthents soil group consists of cut and fill material resulting from disturbed soils. This is usually due to construction, and in this case, can be found along Interstate 68. This is not a valuable soil for either timber or wildlife.

The Upshur-Belmont soils are very stony silt loams. The slope here is very steep, ranging from 35-65%, therefore creating severe limitations for equipment use and high potential for erosion. These soils are found in the Cheat Canyon below the Coopers Rock Overlook and are well suited to wildlife requiring hardwoods, conifers and herbaceous plants, but only fairly suited for wildlife requiring woodland habitat. Of course, severe limitations for developed recreation exist on this soil type due to the steep slopes and presence of large rocks and stones.

2. Preston County: Soils found on the Preston County side of Coopers Rock State Forest are the Dekalb Complex, Ernest Complex, and the Gilpin Complex.

The Dekalb Complex accounts for approximately 70% of the total soil type on the Forest in this county. This soil is classified into three categories and are located throughout the county: loam, stony loam and stony sandy loam. The soil has a high to moderately high production potential for timber. The soil is poorly suited for the kinds of wildlife that find habitat in wetlands or open lands, but is suited for woodland wildlife and those species that require wild herbaceous plants, conifers and hardwoods for habitat. Severe limitations exist in this soil type for developed recreation due to slope and large

stones.

The Ernest Complex accounts for approximately 20% of the land area. This soil has a high to moderately high potential productivity for timber. This soil is also suited to wildlife requiring the following habitat conditions: wild herbaceous plants, hardwoods and conifers. The Ernest soils are also suited for the types of wildlife that find habitat in open land and woodland, but poorly suited for wetland wildlife. For recreation, there are only moderate limitations to development, mainly due to slope and wetness.

The Gilpin silt loam and stony silt loam are located in the Lick Run area. This soil is very limited in quantity on the Forest and is suitable for wildlife requiring conifers, hardwoods and wild herbaceous plants as well as those that use open land and woodland habitat. The soil has a moderately high productivity potential for timber, but moderate limitations exist where developed recreation is concerned due to large stones and slope.

More detail on soils distribution on the Forest can be obtained by consulting the soils maps and tables in the Appendix. Suitability ratings for mentioned purposes are also explained in the Appendix.

II. ANALYSIS OF MANAGEMENT REQUIREMENTS

Multiple-use management is a concept which tries to satisfy the needs of a number of varying interests using a single resource base. Sometimes these diverse interests are in-compatible. By developing the resource through a multiple-use approach, priorities can be set and provisions made to reduce conflicts. Central to this concept is determining each interest's ***needs*** as opposed to its ***desires***. With this in mind, this plan will address several of the more prominent current issues, hopefully establishing goals and developing the relationships between them.

A. Boundaries

Regardless of the objectives, the location of boundaries is one of the primary considerations when attempting any type of management activity. Boundaries must be known and well marked if possible, even on State Forest land. Coopers Rock State Forest is similar to many of the other state forests, in that it was at one time surveyed and a customary wire strung around the boundary. In many places yellow metal signs were also placed around the boundary, either on trees or on the wire itself. As a point of reference, Interstate 68 is the primary dividing line between the University Research Forest and areas under WV Division of Forestry management.

Much of the wire is now rusted away or buried. A preliminary check of the boundary on the CCC Annex in the summer of 1996 found several areas where the wire was non-existent or buried. It was also found that private landowners have inadvertently encroached upon the Forest in many places.

B. Minerals

The State of West Virginia owns all mineral rights under Coopers Rock State Forest, with the exception of 141 acres of coal and 110 acres of oil and gas. There are areas of sandstones on the Forest which usually contain very good deposits of oil and gas. This fact has made the area very enticing to certain mineral interests and prompted offers from oil and gas companies in the past. The most recent of which garnered much attention.

In the spring of 1995, Alamco, Inc., a large oil and gas company, submitted a proposal to exchange oil and gas rights under the Forest for a large section of land (2,000+ acres) across from the Coopers Rock Overlook. The surface area across the gorge is commonly known as the 'viewshed' and was for sale at the time.[7] Alamco had an option to purchase that land, and wished to negotiate the surface for mineral rights on the Forest side of the Cheat River Canyon. Negotiations ensued, but eventually Alamco withdrew its proposal based primarily on concerns and restrictions addressed by

state management agencies and environmental groups. Since that time, mineral rights have not been a major topic of discussion.

Should other mineral discoveries or deposits become commercially attractive, the Division of Forestry would work with the other agencies involved to insure that the principles of multiple-use are protected. Any disturbances of surface area would have to be planned and meet approval of the managing agencies on the Forest. For example, any road construction would be planned by the Division of Forestry to benefit future forest management work, enhance access for recreational purposes, create new wildlife habitat and protect water quality. Reclamation work and choice of seed mixtures would be coordinated with the Wildlife Resources section in order to obtain the best results not only for erosion control, but for wildlife food and cover.

C. Old Growth

West Virginia's State Parks contain over 70,000 acres which are dedicated to the preservation of all the forest resources. State Parks and recreation areas were established "for the purpose of preserving scenic, aesthetic, scientific, cultural, archaeological or historical values or natural wonders, or providing public recreation". Hunting, timber harvesting and mineral extraction involving surface disturbance on Parks are forbidden. The management of the Parks under these guidelines, while not intended specifically for wilderness or old growth, will evolve into an ample supply of well distributed, wholly natural areas, which should satisfactorily augment the already existent 78,100 acres of Federally designated wilderness areas on the Monongahela National Forest. Currently, Coopers Rock State Forest has a small grove (5-6 acres) of virgin hemlock trees contained on the WVU Research Forest side. This frequently visited area is accessed by a popular hiking trail.

D. Recreation and Aesthetics

Coopers Rock State Forest supports a variety of recreational activities. The current recreational use of the Forest, with the exception of overnight camping and raccoon hunting, is for day-use activities with rustic type facilities. The most prevalent of these is hiking, followed closely by picnicking, mountain biking and rock climbing.

The DNR Parks and Recreation Section manages approximately 424 acres on the Forest, including the Overlook area and the surrounding picnic areas, the McCollum camping area, the Henry Clay Iron Furnace and adjacent parking lot, the Day Use parking lot, the residences (superintendent and assistant superintendent) and Forest office complex, the water plant and reservoir and the trout pond area. This includes all of the currently developed recreation facilities and the Division of Forestry has designated these areas as being excluded from other management practices. In

addition, Parks and Recreation maintains hiking and cross-country ski trails, not only in the improved recreation area, but throughout the Forest.

Occasionally conflicts arise when forest management activities occur adjacent to recreation areas. Timber harvests cannot be hidden, but in many cases, their location, size and prescription can be altered to lessen their visual impact. To the extent possible, aesthetic corridors are provided to lessen the impact of a harvest area. Considerations will be given to buffer zones adjacent to roads and recreation areas, maintaining forest vistas and minimal disturbance of existing forest trails. Forest management activities will enhance the forest recreation by creating a healthier forest, improving the quality and quantity of plant and animal life, encourage a wider distribution of species, create additional and easier access and provide additional trails for hiking, skiing and biking. Post activity reclamation includes work done not only for environmental requirements, but also for aesthetic needs. The West Virginia Division of Forestry will conduct all forest management activities in a manner sensitive to multiple uses.

E. Roads

Coopers Rock State Forest is fortunate, as far as access is concerned, to be bisected by Interstate 68, which runs east-west from Hancock, MD to Morgantown, WV. The primary access into the main forest area is at Exit 15 of this interstate. When the right-of-way for this highway was purchased and for many years after construction through the Forest, this road was known as US Route 48. After its completion to Hancock, the official designation was changed to Interstate 68.

The road system on the Forest consists of state maintained paved roads, dirt and gravel forest access roads and primarily dirt forest roads used for service and emergency use. The main access road is paved and leads from the superintendent's residence, over the interstate and through the Forest to the main recreation area and the Coopers Rock Overlook. This road is designated Monongalia County Route 73/16, and has a total length of approximately 3 miles. There are two main access gates on this road; the first (main Forest gate) is just past the Day Use parking lot, and the other is immediately past the entrance to McCollum Camping Area. The main Forest gate is closed from mid-December through the end of March. The gate immediately past the entrance to McCollum Camping Area is closed daily from dusk till dawn. The other paved road is called the Henry Clay Iron Furnace Road (Park & Forest Route 801), which intersects the main Forest road just south of the main gate. This is a limited access (gated) road approximately 2.6 miles long that leads to a loop and parking lot above the Furnace. Other Park & Forest Routes are 802, which serves the McCollum Camping Area and 803, lending access to the picnic areas and Preacher's Circle. All other roads in the main portion of the Forest are either service roads or previous access roads built for harvesting operations.

The CCC Annex is accessed using the Quarry Run Road (County Route 69/5) off the Fairchance Road (State Route 857). Delta Route 26 branches off to the left, traverses the annex, and accesses residences on the northern end of the annex. Other than forest access roads built for timber harvests, these are the only roads that run through that portion of the Forest.

Preston County Route 73/2, commonly known as the Pisgah Road, lays along a portion of the eastern Forest boundary and intersects further south with 73/4 near Big Run. County Route 73/4 leads to the Cheat River and Beaverhole area, directly south of the Forest.

There are currently no roads into the Lick Run area. At the time of the harvest operation in that compartment, a short-term right-of-way was purchased from a landowner to the east. That right-of-way is no longer available.

Access needs to be improved into the eastern sections of the Forest, either through upgrade of an existing road, or construction of a new road. Any of this work would most likely be done in conjunction with management prescriptions. This approach relieves the State of appropriating funds for road construction, and roads would be built by logging contractors to State Forest standards as part of other management activities. Maintenance is dependant on funds also. This work is primarily custodial and is performed by Division of Forestry personnel as time allows. Efforts are hampered, however, due to the lack of any mechanized equipment available to assist with performing needed maintenance. As funds become available, some of this work can be contracted out as needed.

F. Timber

The trees of the forest are the reason for all of the opportunities provided by State Forests. They are also the point of contention whenever conflicts of interest arise. The dual utility of this resource, as a standing tree or a harvested crop, provides the challenge when managing this resource. The demands placed on the forest, in addition to the health and vigor of the forest, require that this renewable resource be used in both forms. The standing tree serves recreational purposes, wildlife habitat needs, watershed protection and forest management practices. Once harvested, the trees again serve to highlight forestry practices, diversify wildlife habitat, enhance certain recreational aspects, generate income and provide a useful commodity for the benefit of society.

Two of the cooperating agencies, WVU Division of Forestry and the WV Division of Forestry, are involved with the actual management of timber at Coopers Rock State Forest. Other agencies are affected by it and have an interest in this activity too. Management, including the removal and use of timber, is a way to manipulate the forest

cover in order to accomplish the desired goals for the Forest, including demonstration, teaching, research and wildlife.

The WVU Division of Forestry, which leases and controls over 7,600 acres[8] of the Forest on the north side of Interstate 68, has developed an overall forest management plan for that area. This plan, updated in 2005, lists the goals and objectives that are to be accomplished. This plan will be followed and revised periodically to reflect the needs of West Virginia University.

When the original management plan for the south side was prepared in 1972, 5,751 acres were considered. Approximately 1,250 acres of that area, including all of the improved recreation sites, were considered more valuable for recreation, aesthetics and wildlife habitat protection, and were classified as noncommercial forest at that time. The remaining 4,501 acres were classified as commercial forest land. However, as in the beginning, the entire 5,751 acres will be considered by the Division of Forestry in meeting the requirements for multiple-use forestry.

Since 1979 there has been approximately 2.3 million board feet of timber harvested from Coopers Rock State Forest. This is only a small portion of what could have been harvested and still allow the forest to grow at its optimum potential. In time, the growth that the forest is now experiencing will slow and eventually decline, resulting in a considerable loss in volume. Planned harvests can prevent a stand from entering this stage of lost vigor and keep it at its most productive levels not only for timber, but also for wildlife and other uses. An increase in the harvest rate is desirable in order to maintain the health and vigor of the Forest. The increased level of harvest would be dependent upon favorable market conditions affording profitable removal of the forest products.

The most recent Forest inventory was completed in 2000. Data collected included tree species, size, condition and quantity. In addition, information was collected on ground cover to determine suitability for wildlife. The inventory results indicated that approximately 59 million board feet of timber existed on the Forest at that time.

Once the data from the 2000 Inventory was processed, it was noticed that red maple made up a significant portion of the total pulpwood sized trees per acre. This indicates that red maple will become the predominate tree species on the Forest in the future if no silvicultural practices or natural disturbances occur in the meantime. The US Forest Service, Forest Inventory Analysis data shows this phenomenon occurring across the entire northeastern region of the country.

The presence of fire in the ecosystem before and during European settlement is well documented and limited the distribution of red maple and other thin barked species. Red maple, once known as swamp maple, was mostly confined to swampy habitats. Fire has been excluded from the Forest for at least 60 years. This and the lack of other

disturbances has lead to the increase in red maple distribution and a decline of shade intolerant species (ie. oaks, black cherry, yellow poplar) in the understory across the Forest. Red maple has limited wildlife benefits and is a shade tolerant species, meaning that it can remain in the understory for many years awaiting release. By not having oaks and black cherry available to replace the maturing overstory trees a situation is created which is detrimental to many wildlife species. In addition to the wildlife benefits, a forest of diverse species and ages is better able to withstand insect infestations and diseases. Early successional habitat, which is created when providing age diversity, is also very important to many species of wildlife.

G. Water

Coopers Rock State Forest sits high on a ridge where many streams begin either on the Forest or nearby. This provides an excellent opportunity to show the effects of land management on stream conditions. It also provides the opportunity to show that forest management activities can be conducted while maintaining high quality streams.

Forest management practices and prescriptions are planned with water quality as a major consideration of the operation. The intent is to conduct the harvesting using methods and techniques that will provide the least amount of land disturbance and maintain the quality of the streams. Best management practices (BMPs) are guidelines pertaining to road location, construction, maintenance and reclamation. They are implemented with the objective of maintaining or improving water quality. Surface water control systems are installed on all roads and may include culverts, ditches, water bars, use of gravel, broad-based dips and grade breaks.

Streamside management zones (filterstrips) are established in prescription areas. These areas are given special consideration in relation to timber marking and road location with the goal of minimum disturbance in this zone. Water conditions are closely monitored during logging operations and adjustments are made, including closing down operations if conditions warrant.

All roads on logging operations are limed, seeded and fertilized during the reclamation phase. They are then maintained for future forest use and provide outstanding permanent hiking and ski trails, wildlife habitat and access for forest protection.

H. Wildlife

The most common users of the Forest are the wildlife residents. These inhabitants represent almost all of the species typical to the upland hardwood forests of the central Appalachian Mountains. Each species has unique habitat requirements which when combined and present in a close area constitute that animal's home range. These home ranges vary in size from a few square feet for salamanders to several square miles for bear. Every activity, whether natural or man-made, which changes the character of the Forest will impact one species or another, either for better or worse.

Maintaining and enhancing diversity of habitats can continue to be accomplished through silvicultural practices such as crop tree release, thinnings, harvesting of mature timber and the associated factors of each that create change. Additional wild turkey and ruffed grouse brood range can be enhanced by seeding logging roads to beneficial herbaceous vegetation, limiting access on these roads and maintaining all current clearings by periodic mowing. Also, the protection or enlargement of spring seeps and propagation of wild grape is recommended to further strengthen turkey habitat and increase population.

Evenage silvicultural practices would increase the amount of browse and escape cover on the Forest. Practices that regenerate areas 10 to 20 acres in size would greatly enhance the population of ruffed grouse. Evenage cuts should be at least 10 acres in size and located in the same general area, but not isolated. Evenage cuts which are isolated tend to be heavily browsed by deer and regeneration could become a problem. The value of an evenage cut is greatly influenced by its shape. Long, irregular shaped cuts are more beneficial to most wildlife species than are square or round cutting areas. Song birds also utilize these areas to promote quick development of young fledglings.

Selective harvesting, another silvicultural practice, benefits a large variety of wildlife species, both game and nongame. This practice allows the forest to develop characteristics such as large standing snags, nurse logs, downed timber, varied vertical structure and uneven age classes. This habitat is beneficial for many songbirds, small mammals and amphibians and is an important component for game and other high profile species as deer, bear, furbearers and wild turkey. Areas could be managed to maintain these characteristics by the continued use of selective cutting. Old growth characteristics could be mimicked by girdling trees, felling trees and planting understory species. Surrounding areas could be intensively managed using evenage practices to provide early successional habitat. Portions of existing wildlife openings could be seeded with perennial or annual plant species to attract and support various wildlife species.

By implementing both evenage and unevenage management practices and maintaining log landings as clearings, seeding roads with beneficial vegetation and transitioning borders around existing clearings, most wildlife populations on the Forest could be improved or maintained at optimal levels.

The Wildlife Resources Section's fish management program on Coopers Rock State Forest is primarily interested in trout. One artificial lake and several small streams are suitable for trout. The fish biologists monitor the stream and lake conditions to determine stocking programs and then trout are stocked when and where appropriate. In addition, fish biologists make recommendations on all activities that could have an affect on stream and lake conditions.

I. Invasive Species

Invasive species are defined as alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health. Alien species are, with respect to a particular ecosystem, any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem[11]. Invasive species pose an immediate and future threat to Coopers Rock State Forest. Endangered, threatened and rare plant and animal species are especially at risk because they often occur in small populations that make them particularly vulnerable to competition from more aggressive invasive plants. Other potential problems caused by invasive species include replacement of native plant species currently found on the Forest. Many native species such as northern red oak are important for wildlife. Certain invasive species can hinder tree regeneration by smothering seedlings. Wildlife can be especially affected through elimination of native food sources. Several invasive species, such as Japanese stilt grass, can create wildfire hazzards due to their thick growth and natural flammability Biological diversity can be reduced if invasive species are not held in check.

Invasive species known to occur on the Forest include Japanese stilt grass, tree-of-heaven and multiflora rose. Other species that may pose a future risk include Johnson grass, Japanese knotweed, garlic mustard, meadow brome, spotted knapweed, purple loosestrife, sericea lespedeza, Japanese honeysuckle, Amur honeysuckle, Morrow's honeysuckle, Tartarian honeysuckle and kudzu. See appendix for available fact sheets on these invasive species.

Agencies involved in the management of Coopers Rock State Forest are currently working to identify areas of invasive species infestation. Periodic monitoring is needed, especially along roadways and water courses where invasive species are more likely to be introduced and become established. When problem populations of invasive species are located on the Forest, control measures will be implemented. Awareness and education about invasive species and the threats they pose are extremely important for users of Coopers Rock State Forest and the State of West Virginia as a whole.

III. QUANTITATIVE DATA

A. Summary of Acres

Areas of Coopers Rock State Forest not leased to West Virginia University.

LAND MANAGED BY WV DIVISION OF FORESTRY	AREA (ACRES)
DOF Management Compartments	4387.51
DOF area between Rt. 73 and I-68	47.97
Managed Viewshed	773.26
Subtotal 1	**5208.74**
Buffer Zones	**Area (Acres)**
stream buffer zones	282.26
trail buffer zones	169.99
road buffer zones	74.87
utility rights-of-way (60 ft. wide)	36.17
Subtotal 2	**563.29**
LAND MANAGED BY WVDNR PARKS & RECREATION SECTION	**AREA (ACRES)**
overlook / concession / picnic area	211.39
McCollum camping area	42.60
Trout Pond area (Coopers Rock Lake)	12.00
water reservoir	9.83
Henry Clay Iron Furnace parking area	4.52
Henry Clay Iron Furnace Historic Site	2.11
Day Use parking area	1.97
water plant area	1.77
Subtotal 3	**286.19**
DOF MANAGEABLE FOREST ACRES	**3872.19**
TOTAL AREA (subtotal 1 + subtotal 3)	**5494.93**

B. Summary of Volume

The volume figures referred to in this plan are from the International ¼" Tree Scale. The following figures were derived from the 2000 inventory data.

COMPARTMENT NUMBER	AREA (ACRES)	NUMBER OF SAMPLES	TOTAL BOARD FOOT VOLUME
1	196.26	54	2,339,000
2	167.75	44	2,652,000
3	181.26	47	2,843,000
4	954.19	262	12,576,000
5	217.12	49	3,213,000
6	755.11	207	10,387,000
7	677.43	184	7,975,000
8	1116.73	305	15,147,000
9	95.86	21	1,602,000
10	39.55	7	499,000
TOTALS	**4401.26**	**1180**	**59,233,000**

This is the total estimated merchantable volume contained in trees 12" DBH (diameter breast height) and larger. Not all of this volume is in desirable species or in good quality trees. Overall, however, this forest contains an excellent selection of high quality hardwood timber. The Forest averages approximately 13,458 bd. ft. per acre (based on 2000 inventory data) and is growing an average of approximately 135.39 board feet per acre per year (based on volume totals from 15 year projected growth).

C. Average Annual Growth

The annual growth estimates are based on 4 modules: a Diameter Increment Module (based on radial growth increment data collected on the Forest during 2003 and 2004), a Height Increment Module [utilizing sawlog merchantable height equations developed and published by Brooks and Wiant (2004)], a Survival Module (using equations based on US Forest Service Forest Inventory Analysis (FIA) data from the southern Appalachians) and a Product Adjustment Module. See appendix for a complete explanation of the radial growth projection system.

The average annual growth for the WV Division of Forestry managed sections on the Forest is approximately 135.39 board feet per acre per year. The total annual growth increment for the Forest is estimated at 595,867 board feet per year. Catastrophic events can have a retarding effect on this progression. It is also unrealistic to believe that these rates will remain unchanged if left alone. At some point, decadence and overmaturity will develop and growth rates will decline. Continuous monitoring and observations of the managers will detect and predict these changes. The 2003-2004 installation of 110 CFI (continuing forest inventory) plots on the Forest and their future visitation and remeasurement will greatly enhance the WV Division of Forestry's knowledge of Forest growth and dynamics.

The following tables contain estimated total Forest board foot volume and estimated board foot volume per acre by Compartment for the years 2000 (date of inventory) and a 15 year growth estimate.

Total Forest Board Foot Volume by Compartment

COMPARTMENT NUMBER	TOTAL VOLUME [1] (2000)	TOTAL VOLUME [1] (2015) *(projected)*
1	2,339,000	2,566,000
2	2,652,000	2,935,000
3	2,843,000	3,279,000
4	12,576,000	14,356,000
5	3,213,000	3,880,000
6	10,387,000	12,050,000
7	7,975,000	9,238,000
8	15,147,000	17,498,000
9	1,602,000	1,785,000
10	499,000	584,000
TOTAL	**59,233,000**	**68,171,000**

[1] Board feet International 1/4 inch Scale (only includes trees 12 inches DBH and larger)

Forest Volume per Acre by Compartment

COMPARTMENT NUMBER	VOLUME [1] (per acre) 2000	VOLUME [1] (per acre) 2015 *(projected)*
1	11,900	13,100
2	15,800	17,500
3	15,700	18,100
4	13,200	15,000
5	14,800	17,900
6	13,800	16,000
7	11,800	13,600
8	13,600	15,700
9	16,700	18,600
10	12,600	14,800
AVERAGE	**13,990**	**16,030**

[1] Board feet International 1/4 inch Scale (only includes trees 12 inches DBH and larger)

D. Estimated Permissible Cut

Each forested area is evaluated to determine the amount of harvestable timber that is contained therein. This is known as the permissible cut and represents the excess volume on the site which, when removed, will still allow the site to take full advantage of its growing capacity. When applied to management compartments permissible cut is also useful in determining when and where to look for harvest needs. The forest wide permissible cut also helps track the overall development of the forest. Currently, approximately 595.9 MBF of timber could be cut each year without reducing the total volume of the Forest.

E. Multi-disciplinary Data

1. Boundaries: For the purposes of this plan, three separate areas of Coopers Rock State Forest are identified. These are the CCC Annex, the main Forest on the south side of Interstate 68 and the Lick Run area.

Main Forest (south of I-68)

Condition: Interstate fence along most of the north side; blue painted trees and/or single strand wire found along most of the boundary; can also find many of the yellow metal State Forest signs along Pisgah Road. Most of the line along the Cheat River is not marked or very sparsely marked. It is very likely that encroachment occurs along the eastern boundary in the Pisgah Road area

Last Action: Most of the boundary, with the exception of the river front, was painted less than 10 years ago

Needs: Need to establish some markers along the river; freshen paint marks along lines and refresh all corners.

Lick Run Area

Condition: Area was cut off from main forest with construction of I-68. The north side is fenced and in good condition. Some of the yellow metal signs were found, but mostly just blue paint on trees. The wire is visible in some areas, often under leaves or debris. Possible encroachment by neighboring landowners on Forest.

Last Action: Unknown; believed to have been painted within the last 10 years.

Needs: Paint needs refreshed along lines and especially at corners. The line needs cleared in some places.

CCC Annex

Condition: Most segments of line are painted with blue paint. Single strand wire and yellow metal signs are visible along the western and northern boundaries. It is fenced along the northern and eastern sides. The line is difficult to see at the southeastern section around the old strip mine. Some severe encroachment problems exist around Adams Heights and along the entire northwestern line.

Last Action: The line was flagged during a preliminary field check, in the summer of 1996.

Needs: Need to refresh paint and clearly establish corners.

2. Other DOF Holdings: The West Virginia Division of Forestry has retained control of certain areas on both sides of the Forest. On the north, in the WV University Research Forest, the Division of Forestry is responsible for the maintenance and protection of the approximately 28 acre Archery Range and the Sand Springs Fire Tower site which is approximately 3 acres in size. Additional areas include: the approximately 12 acre Trout Pond area which is managed by the WV Division of Natural Resources, Division of Parks and Recreation; an approximately 48 acre area adjacent to the Division of Highways Mandatory Truck Brake Check Area, contained between I-68 and State Route 73; and a small parcel situated west of State Route 857 and just north of Morgan Run, in the general vicinity of the Calvary Church. These last two areas are managed by the WV Division of Forestry.

3. Roads and Rights-of-Way: The road system on Coopers Rock State Forest can be classified into three categories based on primary use or intent. Public access roads are either paved, tarred and chipped or gravel and are generally not restricted to traffic from early April to mid-December. This category also includes all established parking areas on the Forest. Service roads are usually dirt or gravel and are restricted to use only by State vehicles or foot travel. Rights-of-way of note deal primarily with overhead electrical powerlines. Forest management roads are those that have been constructed in conjunction with harvesting operations or research areas. This includes truck haul roads, skid roads and landing areas. Access for emergencies and maintenance activities are common uses of the entire road system. Of course, many of the roads are used for more than one purpose. See the “Physical Features” maps in the Appendix for more information.

Public Access Roads and Parking Areas

Length of roads:	44,870 feet (8.50 miles)
Surface area of roads:	28.95 acres
Parking lots surface area:	3.09 acres
Existing structures:	There are no bridges on any of the public access roads on the Forest except those that cross Interstate 68. Drainage is accomplished by use of ditching and culverts.
Condition:	Most roads and parking lots are in fair to good condition.
Maintenance:	Is performed by Parks & Recreation and DOH personnel.

Service Roads (Authorized Use Only)

Length of roads:	36,123 feet (6.84 miles)
Surface area of roads:	8.06 acres
Existing structures:	There is no record of existing bridges on any of the service roads. Most of the roads have a few culverts, the largest being 24" in diameter.
Condition:	Some of the service roads are in good condition. Most are in fair shape. A couple are in poor to impassable condition. Many of these roads are recommended 4WD use only.
Maintenance:	Is performed almost exclusively by Parks & Recreation personnel.

Rights-of-Way (Power lines)

Length of line R-O-W:	25,508 feet (4.83 miles)
Surface area of R-O-W:	36.17 acres
Condition:	Rights-of-way have been cleared within the last 3 years; last clearing was excessive
Maintenance:	Main line maintenance is performed by Allegheny Power crews. The feeder line is maintained either by Parks & Recreation personnel or Allegheny Power personnel.

Forest Management Roads (Including Timber Harvest Areas)

Kelly Run Harvest

Length and Area of Haul Roads:	9,345 feet (1.77 miles)	6.40 acres
Length and Area of Skid Roads:	22,316 feet (4.23 miles)	7.18 acres
Number of and Area in Landings:	4 landings	1.00 acres
Existing Structures:	15 culverts, no bridges	

Condition:	Access is closed to vehicular traffic. Roads are in good condition. Trees starting to grow in skid roads.
Maintenance:	All roads were seeded after harvesting operation was completed. No current maintenance is performed. The area is periodically checked by Forestry and Parks & Recreation personnel.

Lick Run Harvest

Length and Area of Haul Roads:	8,448 feet (1.6 miles)	5.00 acres
Length and Area of Skid Roads:	6,544 feet (1.24 miles)	2.05 acres
Number of and Area in Landings:	2 landings	1.00 acres
Existing Structures:	8 culverts, no bridges	
Condition:	All roads were seeded after completion of the harvesting operation. The roads have grown over due to no vehicular access into the compartment.	
Maintenance:	No current road maintenance is planned in this area. Any maintenance needed would be the responsibility of Forestry personnel.	

Scott Run Harvest

Length and Area of Haul Roads:	10,032 feet (1.90 miles)	7.12 acres
Length and Area of Skid Roads:	14,934 feet (2.83 miles)	5.01 acres
Number of and Area in Landings:	2 landings	.21 acres
Existing Structures:	11 culverts, no bridges	
Condition:	All roads were seeded after harvesting was completed. All roads have grassed in very well, overall, roads are in good condition.	

Maintenance:	Maintained primarily by Parks & Recreation personnel. The haul road has become a favorite recreational corridor. It is worked on periodically by Forestry personnel.

Clay Run Harvest

Length and Area of Haul Roads:	18,375 feet (3.48 miles)	14.35 acres
Length and Area of Skid Roads:	29,330 feet (5.56 miles)	10.12 acres
Number of and Area in Landings:	9 landings	2.97 acres
Existing Structures:	28 culverts, no bridges	
Condition:	This road system is frequently used by mountain bike enthusiasts and has developed a few low spots which collect water. Overall, the roads are in good condition.	
Maintenance:	Maintenance is performed mainly by Parks & Recreation personnel, with periodic cleaning by Forestry personnel. Last work was done on 8/27/03 by Forestry personnel, including the unblocking of a large culvert.	

USFS Crop Tree Demonstration Area

Length and Area of Haul Roads:	302 feet (.06 miles)	.08 acres
Length and Area of Skid Roads:	1,880 feet (.36 miles)	.39 acres
Number and Area in Landings:	1 landing	.50 acres
Existing Structures:	One culvert is at the haul road intersection with the Henry Clay Iron Furnace Road.	
Condition:	This area is used for foot travel only. Most of the roads have converted to trails, except for the haul road area.	

Maintenance:	None of the skid road is maintained, except for foot travel and this is done by USFS or State personnel. The haul road and landing area are mowed periodically by Parks & Recreation or Wildlife Resources personnel.

Currently, all of the major truck haul roads on the Forest could be placed into service with a minimum of upgrade work. There are some sections of service roads that should be upgraded to provide emergency access for fire suppression or rescue efforts if necessary.

4. Trails: The trail system at Coopers Rock State Forest is a network developed from old roads, tramways, access roads and casual use. Few of these trails were developed for a specific use and many of them serve dual purpose as forest access roads.

It is the intent of the West Virginia Division of Forestry to manage the Forest in a manner that will continue to provide a trail system for as many compatible uses as practical. Care will be taken to account for as much of the current trail system as practical and compatible with planned forest uses. In order to ensure compatibility with other uses, new trails will be preplanned before they are developed. Current trails in use on Coopers Rock State Forest will be classified into three categories; permanent, special use and casual.

Permanent

Permanent trails will be designated initially after considering use, location and compatibility. They will be maintained in their current location whenever possible through agreements with the Parks and Recreation section. In cases where permanent trails serve dual purpose as access roads, the road use will take priority when necessary although trail use will be continued. Occasional interruption for other forest uses may occur, but will be minimized and continued trail use will be maintained. These trails will also be used for emergency forest access. Trails designated as permanent are as follows:

Clay Furnace Road & Trail: This dual duty trail and forest access road is approximately 0.6 mile in length and begins at the Henry Clay Iron Furnace parking lot. It extends down the slope, mostly on a gentle grade, until it reaches the Furnace.

Clay Run Road & Trail: This trail begins at the entrance to the McCollum Camping Area and extends down Clay Run to the Henry Clay Iron Furnace. It is approximately 1.7 miles in length and serves dual duty as an access road for most of its distance.

Cross-country Ski Trail(s): These trails were constructed in the mid to late 1970s and basically consist of an intermediate and an advanced loop. Both trails start at the Day Use parking lot adjacent to the main Forest gate and head toward the Clay Furnace Road. The advanced ski trail splits below the road; one side heads south toward the reservoir and leads to the Clay Run Road/Trail, while the other branch heads directly for the Furnace in a westerly direction. The combined length of this trail is approximately 3½ miles. The intermediate loop, approximately 2 miles long, stays in the upper portion of the Clay Run watershed, and returns to the Day Use parking lot.

Mont Chateau Trail: This is a moderate to steep trail that originates at the Henry Clay Iron Furnace and follows Clay Run and then Quarry Run to the Forest boundary. This trail is approximately 1.7 miles in length. The trail continues down to Cheat Lake on private property. Two sections of this trail exist, one on the north side and one on the south side of Clay Run. The South Mont Chateau Trail provides a connection to the Ridge Trail.

Rattlesnake Trail: This trail begins at the concession stand and leads to the Rock City area. Many casual side trails intersect with this trail.

Raven Rock Road & Trail: This trail begins at the gate to the road leading to the woodshed. It follows the road for a short while then travels through the woods until it reaches an intersection with the power line at Raven Rock. This dual duty access road/trail is approximately 1.5 miles in length. An approximately .7 mile long trail from the McCollum Camping Area provides access to the Raven Rock Trail without having to use paved roads.

Rhododendron Trail: The perfect place to see our state flower. This trail begins at the lower picnic area and extends to the Henry Clay Iron Furnace. It is 0.9 miles long.

Ridge Trail: The ridge trail starts at Rock City and extends down the ridge to connect with the South Mont Chateau trail on lower Clay Run. It is approximately 1.8 miles long and relatively easy walking.

Rock City Road & Trail: This road and trail begins as a road at picnic shelter #3 and leads to the Rock City picnic shelter, passing wildlife openings #20 and #21. From the shelter, it continues as a trail until its intersection with the Ridge Trail.

Scott Run Trail: This trail begins near the main Forest gate and extends down Scott Run for some distance before it loops northwest to end at the McCollum Camping Area. This entire trail covers a distance of approximately 2.7 miles.

Roadside Trail: *(under development)* This trail is not currently completed. When finished, the trail will begin at the main gate, follow the Cross County Ski Trail to the Henry Clay Iron Furnace Road, cross the paved road, pass through the Crop Tree Demonstration Area utilizing existing skid roads, continue up to the Main Forest Road

and roughly parallel that road all the way to the concession stand area. This trail is being constructed with a WV Department of Transportation Recreational Trails Program grant in conjunction with the WV Division of Natural Resources, Parks and Recreation Section and the Coopers Rock Foundation.

Special Use

Special use trails may be designated to meet a special use or need. They may be developed in cooperation with some group or agency to provide a specific function. This will usually be done by special agreement with the group to develop and maintain the trail along with other actions.

Special use trails will be planned to conform to existing roads and trails whenever possible. They may be altered later to fit in with planned or newly constructed access systems. These trails may be constructed outright, or be a combination of existing roads and trails. The life span of such trails may be limited to the duration of the development/maintenance agreement or the length of the need.

Casual

Casual trails are of an unplanned or temporary nature. Many of these trails utilize access roads created during forest management activities. They frequently have limited use and usually are unimproved. The Division of Forestry does not recognizes these as official trails. Because of the casual nature, limited use and sometimes temporary needs for these trails, the Division of Forestry will not consider improvement or maintenance. No attempt will be made to list or map the casual trails.

The areas of Coopers Rock State Forest that have been assigned to the DNR Parks and Recreation Section to be managed for improved recreation contain a number of trails that serve those areas. Their primary purpose is to provide improved recreation and generally the trails are incorporated into the recreation system.[9] No further need exists to address these trails.

It is anticipated that the trail system will expand over time to provide additional recreational experiences and enjoyment at Coopers Rock State Forest. Incorporating roads from previous management activities, along with future construction, will provide many more opportunities to develop trails and user access.

It has been noticed in the past that trails have been developed by the public without the input of managing agencies. This is contrary to State Forest Rules and Regulations *(posted at Forest)*. This could jeopardize the expansion of the official trail system. Money spent on reclaiming these illegal trails could be better spent on developing and maintaining official trails.

5. Water Resources: The area of Coopers Rock State Forest under Division of Forestry management has three main drainage patterns into the Cheat River. These are Clay Run, Scott Run and Quarry Run. Lesser drains include Lick Run, Kelly Run and Coles Run. The main forest road leading to the overlook is basically the dividing ridge between Clay Run and Scott Run.

Since the last management plan was developed, a water reservoir of approximately 4 acres has been constructed near the head of the southern fork of Clay Run. This is connected to a water supply system along with the necessary treatment and storage facilities. Heavy use of the facilities at the overlook area have prompted the construction of a sewage treatment plant for this area of the Forest.

Spring development for wildlife habitat improvement has been limited to the wildlife openings on the Forest. Currently, five openings have springs or wet areas and one opening has two spring fed water holes.

Overall, the water resource on Coopers Rock State Forest is considered to be of high quality. The watersheds have been lightly impacted by human use and there are no known water quality problems at this time. However, it would benefit all agencies involved in land management to devise a water quality sampling system for the Forest. This would establish baseline information on water quality and would allow for tracking of any water quality problem that should arise.

In 2004, the U.S. Environmental Protection Agency initiated a two-year headwater intermittent stream study on the Forest. The main objectives of the study are to develop sampling protocols for headwater intermittent and perennial streams and to identify physical and biological indicators of hydrologic permanence. Sixteen sites were established and monitoring devices were placed in the headwaters of several streams to monitor water flow. Macroinvertebrates, salamanders, algae and mosses are to be sampled and some limited water chemistry measurements and physical habitat data collected.

6. Wildlife Areas: There are twenty-one designated wildlife openings scattered throughout Coopers Rock State Forest which are maintained by the WVDNR Wildlife Resources Section. These areas range in size from one fourth of an acre to three acres. Generally, all have been planted to a combination of Kentucky 31 fescue *(future use discontinued)*, orchard grass, ladino clover and birdsfoot trefoil. In most cases the trefoil and clover have dropped out. Other grasses and herbaceous plants such as deertongue grass and milkweed are present as volunteers. Most of the openings are mowed at least once a year. Some near the roads are mowed more often for aesthetic reasons. Other openings are strip mowed to allow for transitional cover. There are approximately nine water holes in the openings and most have been planted to rows of autumn olive, chinese chestnut, norway spruce or red pine along the edges. In some cases, autumn olive has been planted in rows in the center of the opening. In 2004, half

of opening #6 was planted with a red and white clover mix. This opening was also expanded by cutting trees around the perimeter which will provide approximately one acre of early successional habitat. Additionally, opening # 16 was disced and planted to winter wheat. In 2005, opening #16 was frost seeded with a red and white clover mix. Additional clearings will be seeded with a mixture of grasses and legumes.

All of these areas on the Forest have been intended for wildlife areas and have been managed as such. Other areas important for wildlife are seeded haul roads, skid trails and landings from previous timber harvests. These are not actively managed or maintained specifically for wildlife habitat. The section of old haul road south of Clay Run used during the Clay Run timber harvest is brush-hogged yearly from the intersection of the Clay Run Road/Trail to the high-tension powerline right-of-way.

In addition to the wildlife openings, there is an experimental crop tree demonstration area along the Henry Clay Furnace Road which has a landing and skid trails which have been planted to grasses. Some of the sections in this area have been thinned using guidelines combining both timber and wildlife management. The open landing area is maintained by the DNR Wildlife Manager through periodic mowing.

Following is a specific listing of the wildlife openings on the Forest:

AREA #	ACRES	DESCRIPTION
1	.84	*Location* - Henry Clay Iron Furnace Road, ¼ mile from Main Forest Road on north side at power line corridor. *Cover* - Grass, borders planted to autumn olive and Chinese chestnut.
2	.66	Location - Henry Clay Iron Furnace Road, ¼ mile on south side of road at power line corridor. *Cover* - Grass, borders planted to autumn olive and Chinese chestnut.
3	.22	*Location* - Henry Clay Iron Furnace Road, 1½ miles from Main Forest Road on north side of road on power line corridor. *Cover* - Grass.
4	.23	*Location* - Henry Clay Iron Furnace Road, 1½ miles from Main Forest Road on south side of road on power line corridor. *Cover* - Grass

AREA #	ACRES	DESCRIPTION
5	.15	*Location* - Henry Clay Iron Furnace Road, 2½ miles from Main Forest Road intersection, old main road on north side before loop, up this road 500' on right. *Cover* - Border plantings of autumn olive, chinese chestnut; two spring-fed water holes.
6	.82	*Location* - Henry Clay Iron Furnace Road, end of road, 500' off end of loop to the southwest. *Cover* - Border planted to autumn olive and Chinese chestnut on west side with a row of autumn olive in the center. Border cut on north side (2004). Half of area disced and seeded to red and white clover (2004).
7	2.73	*Location* - 500' northwest of water tank, on power line corridor. Accessed by gated road off of Main Forest Road. *Cover* - Grass, western edge planted to chestnut and autumn olive, several rows of autumn olive in center of plot.
8	.77	*Location* - Northeast of reservoir, 500' southwest of #7 on power line corridor. Accessed by road off of Clay Run Road/Trail. *Cover* - Grass, cattails *(in wet areas)*, scattered autumn olive.
9	.28	*Location* - West side Main Forest Road, 300' behind Clay Run Trail parking area across from campground entrance. *Cover* - Grass.
10	.94	*Location* - At entrance to McCollum Camping Area, east side of main road, Scott Run Trail runs through extreme south west corner. *Cover* - Grass, apple trees, center strip and borders of autumn olive, spring on southeast edge
11	.15	*Location* - Across campground road from and just southeast of #10. *Cover* - grass, apple trees, borders of autumn olive

AREA #	ACRES	DESCRIPTION
12	.11	*Location* - Next to Main Forest road, on west side of main road on power line corridor supplying electric to camping area. *Cover* - Grass
13	.45	*Location* - Across main road from #12, on power line corridor. *Cover* - Grass
14	.16	*Location* - On high-tension power line corridor, 0.3 miles from intersection with Clay Run Road/Trail. Accessed by road leading from Clay Run Road/Trail, through # 15 and down power line corridor. *Cover* - Grass
15	.45	*Location* - On high-tension power line corridor, southeast of #14. Accessed by road leading from Clay Run Road/Trail. *Cover* - Grass
16	.38	*Location* - 200' north of Main Forest Road, near the Ravens Rock Trail parking area, across from the woodshed gate. *Cover* - grass, north edge planted to Norway spruce and red pine, autumn olive on south side.
17	.52	*Location* - approximately 800' south of woodshed. Accessed by road off of woodshed road. *Cover* - Border planted to Chinese chestnut, center strip of autumn olive, disced and planted with winter wheat (2004), frost seeded with red and white clover (2005)
18	.27	*Location* - just off south side of Main Forest Road on high-tension power line corridor, about 1/4 mile west of Ravens Rock Trail parking area. *Cover* - Grass.
19	.37	*Location* - 1000' southeast of #18 on same high-tension power line corridor. Accessed by gated road off of Main Forest Road. *Cover* - Grass, old DNR deer exclosures nearby.

AREA #	ACRES	DESCRIPTION
20	.42	*Location* - On road/trail to Rock City picnic shelter, about 600 feet from hard road. *Cover* - Grass, western edge planted to Norway spruce and red pine, rest of edge planted to autumn olive.
21	.52	*Location* - On road/trail to Rock City picnic shelter, about 1000' northwest of #20. *Cover* - Grass, center row of autumn olive, Chinese chestnut on north edge.

U.S. FOREST SERVICE CROP TREE DEMONSTRATION AREA

This area consists of approximately eight acres of commercially thinned fores. About half of the area was thinned with wildlife management in mind. It is located on the Henry Clay Iron Furnace Road beside wildlife area #11. The plots thinned for wildlife and timber management are more open as more trees have been removed. These areas are now brush, thick with greenbrier and saplings of black cherry, yellow poplar, red maple and oaks. There is also a large blueberry patch. The landing and all skid roads were seeded to fescue. Fescue has been found to be detrimental to wildlife so is no longer used in State Forest seeding mixtures.

IV. PAST MANAGEMENT RECOMMENDATIONS

Since the completion of the original forest management plan for the Forest, each timber harvest, inventory or special project has been given a designation or name. This section is a record of those activities in chronological order.

A. Kelly Run Timber Harvest

Location

This harvest area comprised approximately 208 acres and was located in the CCC Annex tract (Compartments 1 & 2) of Coopers Rock State Forest. The harvest area is in the southern portion of the compartment, and accessed from Monongalia County Route 69/5, the Quarry Run Road. As with the other harvests, this area derived its name from the watershed in which the harvest lays, Kelly Run of Cheat Lake.

Description of the Timber

Timber on the Kelly Run Timber Harvest area was composed of mature hardwoods and most typically fell into the Yellow Poplar forest cover type group. The harvest area was divided into 3 cutting sections for management purposes. Species composition of the harvest included poplar-basswood-cucumber (43%), mixed oaks (32%), hard and soft maples (15%), with the remaining 10% made up of various miscellaneous species. The harvest only included approximately 4% cull trees, and the average dbh of merchantable trees was 18 inches.

Management Objectives

The objective of this selective harvest was to treat the stand with a “conditioning” cut as the first step to a well stocked stand of vigorous, desirable trees of high quality and growth potential. Other objectives of this prescription were to provide maintenance and improvement of wildlife habitat for the principal species present in the area.

Specific Recommendations

Pre-harvest inventory indicated an estimated total volume per acre of 6,019 board feet for this area, with a basal area of 102 sq. ft. per acre, 55 sq. ft. of which was in trees 12" dbh and larger. Marking recommendations were to remove 25 sq. ft. of basal area per acre and an average of 2,500 board feet per acre. Resulting tally figures indicated a removal of an average 2,535 board feet and 22 square feet of basal area per acre. Cull trees marked for removal accounted for only 4% of the total harvested amount, which favored wildlife management recommendations for den trees. Timber volume marked for removal totaled 527.2 MBF, with an appraised value at time of sale being $16,652.00, or $31.59/MBF.

Status of Completion

The timber was purchased by Wood Products, Inc. of Oakland, Maryland, for a sale price of $21,152.00, or $40.12/MBF. The contract was signed on September 1, 1978; logging was completed by the summer of 1979. Seeding of the roads and landings was completed in the fall of 1979 and the operator's performance bond was released in December of the same year. During the week of October 6-11, 1980, the Division of Forestry opened portions of the harvest area to firewood cutters, and issued 53 free use permits for a total of 76 pickup truck loads. This effort served both the public and the state, by removing topwood from the forest and providing free firewood to several area residents.

B. U.S. Forest Service Grapevine Herbicide Study

Location

This study was conducted in a portion of the Kelly Run Timber Harvest area of Compartments 1 & 2, better known as the CCC Annex. This area is situated on both sides of Monongalia County Route 69/5, the Quarry Run Road.

Management Objectives of the Study

This study was initiated to meet dual objectives. First, the area where the study was conducted was overrun by grapevine and in need of control. Second, the Timber and Watershed Laboratory of the U.S. Forest Service had a need to learn more about grapevines and herbicides. The grapevines that were present in the mature stand and the heavily concentrated clumps of grapevines in scattered openings provided the opportunity to meet the management objectives.

Status of Completion

This herbicide study was implemented in September, 1978, and revisited again in March of 1980. A detailed report of the findings by Mr. Clay Smith is included in the Appendix.

C. Lick Run Timber Harvest

Location

The Lick Run Harvest area is located east of the main body of the Forest, in management Compartments 9 & 10. This area is separated from the main Forest by Preston County Route 73/2, more commonly known as the Pisgah Road. The harvest

comprised approximately 99 acres of the 135.41 total acres of the compartments. The drainage for this area is Lick Run of Little Laurel Run. For harvesting purposes, this area was accessed from CR 73/5 and through two rights-of-way granted from adjoining landowners. There is currently no vehicular access into these compartments, although there is limited authorized access from the top of the truck escape ramp on eastbound Interstate 68 approximately 1 mile from the Coopers Rock exit.

Description of the Timber

Timber on Compartments 9 and 10 most represented the general Yellow Poplar forest cover type group, but was composed of a mixture of mature hardwood species. The harvest area was separated into 2 cutting units for management purposes. Species composition of the harvest was primarily mixed oaks (63%), poplar-basswood-cucumber (23%), maples (5%), black cherry (4%), with the remaining 5% in various miscellaneous species. The average diameter at breast height for merchantable trees was 18 inches, and the harvest included approximately 6% cull trees.

Management Objectives

The primary objective of all the harvests to date has been to condition the forest stands for better health and vitality. The mature, over mature, low vigor, poor quality and poorly formed trees were marked for removal. The resulting stand would be well stocked, comprised of higher quality trees of vigorous health and good growth potential.

Specific Recommendations

Both compartments had an estimated total volume of 947 MBF in 1977. The timber was marked on a single tree selection basis with an estimated 299.1 MBF removed, or about 32% of the total volume. Pre-harvest inventory estimated 8,162 board feet per acre, with a basal area of 106 square feet per acre, 72 sq. ft. of which was in trees 12" and larger. Permissible cut calculations recommended removing 27 sq. ft. of basal area per acre for sawtimber sized trees, and 2,965 board feet per acre. Foresters did well with their marking strategy, removing an average of 3,021 board feet per acre and 23 square feet of basal area. Den trees were preserved for tree dwelling wildlife. Timber volume marked for harvest had an appraised value of $10,704.00, or $35.79/MBF.

Status of Completion

The timber was sold to Wood Products, Inc. of Oakland, Maryland, by signed contract on August 1, 1979. The purchase price was $11,003.84, or $36.79/MBF. Logging of the compartment was completed and the rights-of-way were closed in October of 1980 and the operator’s performance bond was released shortly afterward.

D. Scott Run Timber Harvest

Location

This was the first prescribed timber harvest in the main body of the Forest. Located on the southeast side of the main forest road in Compartment 7, this harvest area comprised approximately 260 acres in the Scott Run watershed of the Cheat River. For harvesting purposes, the area was accessed using the woodshed service road, exiting the main road at the gate which also serves as the trailhead for the Raven Rock Trail.

Description of the Timber

Timber on the Scott Run Timber Harvest area was comprised of both poletimber and mature hardwoods. Both the Yellow Poplar and Oak-Hickory forest cover type groups were represented. The sale area was divided into 3 cutting units, allowing for better control and management of the harvesting and also increasing the opportunity for smaller companies to bid on the timber. Species composition of the harvest included poplar-basswood-cucumber (38%), mixed oaks (35%), hard and soft maples (11%), black cherry (11%) and miscellaneous species (5%). Average size of the merchantable trees was 18 inches in diameter at breast height (dbh), and the harvest consisted of approximately 4% cull trees.

Management Objectives

This harvest was another example of a conditioning cut to move this area of the Forest into a more vigorous and healthy condition. In addition, this area is productive turkey range and efforts were made to improve the habitat for this species. The objective of this prescription was to improve the overall quality of the stands for wildlife and increase potential growth of the trees.

Specific Recommendations

This area was marked on a single tree selection basis. Pre-harvest inventory recommended marking to remove an average of 23 square feet of basal area per acre over the three cutting units, and an average of 2,540 board feet per acre. At the end of the field work, the tally was relatively conservative, with per acre averages of 2,157 board feet and 16 square feet of basal area being marked for harvest.

The Wildlife Resources Section of DNR recommended that since the area was productive turkey range, cutting should be kept at a minimum during the spring nesting season of April and May. Another recommendation involved not removing more than ⅓ of the basal area in red oak stands. These recommendations were followed as closely as possible by the Division of Forestry. Timber marked for removal totaled 561.0 MBF, with an appraised value at time of sale being $23,396.00, or an average rate of $41.70/MBF.

Status of Completion

The Scott Run Timber Harvest was advertised on June 9, 1981, and the sealed bids were opened on July 7, 1981. High bidder for this sale was Coastal Lumber Company of Buckhannon, West Virginia, with a bid of $24,590.65. The contract was signed on August 1, 1981. Logging was completed by March 1, 1982. Later in the spring, the contractor smoothed and graded the roads, and Division of Forestry personnel seeded the logging roads during June and July of 1982. Following the seeding the operator's performance bond was released.

E. Clay Run Timber Harvest

Location

The Clay Run Timber Harvest area was located in Compartment 4 & 6 of Coopers Rock State Forest, lying southwest of the main forest road, approximately 1 mile south of Interstate 68. The harvest area contained approximately 261 acres in the Clay Run watershed, primarily bordered on the east by the large electric powerline and on the west by the picnic area and Henry Clay Iron Furnace. Access into the timber was gained through upgrade of existing access roads and construction of new roads specifically for this prescription.

Description of the Timber

The timber marked on the Clay Run Timber Harvest area was mature hardwoods, from both of the forest cover type groups on the Forest, but primarily in the Yellow Poplar type. Mixed oaks only comprised 20% of the harvest, while maples, yellow poplar and cucumber made up almost 60% of the species harvested. Black cherry (10%) and basswood (3%) were next in line, with the remaining 7% in white ash, birch and miscellaneous species. Of the 4,139 trees, 206 were considered to be culls, accounting for about 5 percent of the trees designated for harvest.

Management Objectives

As with all of the previous harvests on the Forest, this was meant to be an improvement cut. Another objective of this harvest was to increase the vigor of mast-producing trees, thus enhancing habitat for traditional game species.

Specific Recommendations

This area was marked on a single tree selection basis. The stocking on the area to be marked averaged 103 percent, with a total basal area of 114 square feet per acre. The total estimated volume per acre for trees 12 inches dbh and larger was 6,927 board feet at the time of the prescription.

The prescription called to remove about 3,000 board feet per acre in volume and approximately 26 square feet of basal area in trees 12 inches dbh and larger. This would leave the stands near the 65% stocking level, with about 38 square feet of basal area per acre and almost 4,000 board feet of volume per acre and approximately 50 square feet of basal area under 12" dbh for a total of 88 square feet basal area left after harvest. A total of 4,139 trees were marked for harvest on 261 acres, for an estimated total volume of 760,313 board feet. The estimated value of the timber at time of sale was $31,317.00, or $41.19/MBF.

Because the Henry Clay Iron Furnace receives heavy use as a recreational and historical site, three (3) acres around the furnace were excluded from the harvest area. Also, a very light single tree selection harvest took place in buffer zones around streams and hiking trails. In areas where the harvest units joined the main forest road, a light single tree selection harvest was implemented within 200 feet of the road.

Status of Completion

The timber was sold to Frantz Lumber Company, of Grantsville, Maryland, by signed contract on June 15, 1984 and cutting began shortly thereafter. The operator, Mr. Gary Frantz, then suffered some financial difficulties and was unable to fulfill his obligation to the State. After several months of problems, Mr. Frantz filed for bankruptcy in September of 1985 and the sale was held in limbo until December of 1989. Provisions in the settlement of the bankruptcy case allowed Mr. Frantz one year from December 5, 1989 to complete the sale agreement on Clay Run.

Since several years had passed, Division of Forestry personnel had to remark the remaining timber to be harvested under the original contract. This was completed and cutting resumed in July of 1990. Through close supervision by the Division of Forestry, the harvesting operation was completed by the spring of 1991, at which time the operator's surety bond was officially released. The logging roads, landings and skid trails were reclaimed during the summer of 1991.

F. Coopers Rock Crop Tree Demonstration Area

Location

This study area, established in 1989, is located just south of the Henry Clay Iron Furnace Road and is marked by a wooden sign at the entrance to the trail into the demonstration area. Parking is available either at the large parking lot near the main Forest gate or by parking along the Henry Clay Iron Furnace Road. Vehicular access into the demonstration area is restricted to authorized and emergency personnel only. A trail leads from the gate into the demonstration area and passes several numbered posts marking points of interest.

Management Objectives of the Study

The Coopers Rock Crop Tree Demonstration Area is a cooperative effort between the USDA-Forest Service and the WV Division of Forestry. The treatment area is eight acres in size, comprised of three plots that received a Crop Tree Management crown touching release and one plot that received a traditional thinning. In addition, a two acre plot on the north side of the Henry Clay Iron Furnace Road has been designated as a control. This area received no treatment.

The objective of this demonstration area is to provide a hands-on area that foresters, landowners, teachers and other interested individuals can utilize to study the differences between crop tree release categories: timber, wildlife, and aesthetics, all of which can be managed individually or in any combination within a woodlot.

The development of this demonstration area involved the removal of several trees, all of which were piled in a landing area adjacent to the plots. The total volume of these trees was estimated to be 40,000 board feet of logs and an estimated 54 cords of pulpwood and/or firewood.

Status of Completion

The wood product was sold to the high bidder, Maple Creek Lumber of Morgantown, WV on July 7, 1989 for a total of $3,659.00. All of the wood product was removed from the landing within one month of signing the contract and the entire landing and roads were smoothed and seeded to benefit wildlife.

The Coopers Rock Crop Tree Demonstration Area is an ongoing study. The grassy landing and roads are maintained for wildlife use and annual inspections are conducted in the release plots to determine how growth and tree quality has been affected. The site is used often by foresters and others interested in learning more about crop tree management.

More information concerning Crop Tree Management is available from the WV Division of Forestry and the USDA-Forest Service, Northeastern Area State and Private Forestry office in Morgantown, West Virginia.

V. MANAGEMENT REVIEW AREAS

2005/2006 - The Wildlife Resources Section of the Division of Natural Resources has requested assistance with a project designed to expand wildlife clearings on the forest that will provide early successional (scrub and shrub) habitat and a more gradual transition from forest to grassy habitat. This would be accomplished by choosing openings that are not close to main roads. A band of perimeter area trees would be marked to cut. Eight to ten wildlife openings are suitable and would benefit from this practice. Maintenance on access roads to these areas would be reduced by removing trees that shade the road excessively and create wet road conditions. The volume of timber removed from these areas would make it economically feasible for a licensed timber buyer to bid on the project. The state could recover the costs incurred in this project and perhaps realize a small profit which could be reinvested into the facilities at Coopers Rock State Forest.

2005-2015 - Sections of the Scotts Run Harvest area could benefit from cultural work that would prepare the area for improved oak regeneration. This area received an improvement or conditioning cut more than twenty years ago and is ready for additional work. The tree canopy has closed over this area which indicates that the trees present are close to full utilization of the site. Red maple is poised to replace the current mature trees in this forest. As the mature trees leave the stand either due to natural death, disturbance or harvest, red maple trees are far and above the dominant species (33.2 % of the basal area of pulpwood-sized trees) in the understory waiting to take over any openings created in the forest canopy. Since red maple is tolerant of shade it can wait for the opportunity. A diversity of tree species will better withstand insect attacks, disease infestations and climate changes. Reducing the red maple in the understory and preparing the site for a variety of species to get established will help us keep a diverse forest. By creating conditions that will allow oak to regenerate future wildlife food sources will also be assured, along with habitat needs for at least two rare species, the Allegheny woodrat and the small-footed bat. An abundant acorn crop is needed to establish oak seedlings. There can be as many as seven years between bumper crops of acorns[10]. Due to the unpredictable acorn crop, the time needed to reduce competition and get light to the forest floor, this is a long term project. The improvements made by the Wildlife Manager to wildlife openings can help reduce the deer pressure on oak seedlings.

2006-2008 - During the inventory work done in 2000, stands of yellow poplar in Compartments 9 & 10 were found to be infected with shoestring root rot, (*Armillaria mellea*). This is an indication that these trees are stressed, from past damage, old age and or over crowding. Most of these compartments have average basal areas of over 200 square feet per acre indicating these areas are too dense for optimum tree growth. The high tree densities are most likely leading to the stress and disease evident in these compartments. This area may have some access problems due to the interstate and private land surrounding these compartments. This section of the forest is far removed from any recreation areas on the Forest.

2007-2010 - A portion of the Forest lies between the interstate highway and the access road to the WVU Research Forest. Part of this area was taken by the truck weigh station and safety stop. The remainder of this area is well located to demonstrate forestry practices to the public. A parking area and interpretive signs could be placed to allow for self guided tours with easy access from the interstate highway

Reference Notes

1. Extracted from information included in WVU Division of Forestry, 1985, *Forest Management Policies, Guidelines and Objectives for the West Virginia University Forest*.

2. Statistics in this paragraph are based on information in unpublished reports done in 1997 by local field agents of the WV Dept. of Agriculture, Plant Industries Division.

3. This was the accepted standard at the time of the first management plan preparation, and is referred to as Society of American Foresters, 1954, *Forest Cover Types of North America (Exclusive of Mexico)*.

4. All forest cover type information and references are taken from Society of American Foresters, 1980, *Forest Cover Types of the United States and Canada*. More extensive information for each cover type may be found in this publication.

5. All wildlife population information extracted from unpublished reports done in 1996 by the WV Division of Natural Resources, Wildlife Resources Section biologists stationed in the District I (Fairmont) office.

6. The West Virginia Natural Heritage Program was founded in 1975 and operates as part of the Division of Natural Resources, Wildlife Resources Section. The program tracks rare species of plant and animals, and also serves as a clearinghouse for information on the state's natural history.

7. On November 1, 1996, the Division of Natural Resources, Public Lands Corporation, executed a deed on approximately 2,000 acres across the Cheat River canyon from the Overlook. This area is under the management responsibility of the WVDNR Wildlife Resources Section and is officially known as the Snake Hill Wildlife Management Area.

8. Information concerning the original lease creating the West Virginia University Forest approximated the area as 7,068 acres. Through acquisition of inholdings and other land transactions, the University Forest is now over 7,600 acres in size.

9. Some information in this section was referenced, with modification, from WV DNR, 1995, *Coopers Rock State Forest Map & Trail Guide*, and from Rodd Judith S., 1994, *A Guide to Coopers Rock State Forest*. More information about the trails on the Forest can be obtained in these documents.

10. Godman, R.M. and Mattson, G.A. (1976) *Seed Crops and regeneration problems of 19 species in northeastern Wisconsin*. USDA Forest Service Research Paper NC NC-123.

11. Federal Register, Volume 64, Number 25; Monday, February 8, 1999, Presidential Documents, *Executive Order 13112 of February 3, 1999, Invasive Species.*